CATALOG No. 933

WACOM PRODUCTS INC.

TERMS AND CONDITIONS OF SALE

WARRANTY—The Seller warrants that, at the time of shipment, the products manufactured by the Seller are free from defects in material and workmanship. The Seller's obligation under this warranty is limited to replacement or repair of such products within one year from the date of shipment. No material is accepted for replacement or repair without the written authority of the Seller. Replacement or repair is made only after an examination at the Waco, Texas, plant shows defective material or workmanship at the time of manufacture. All shipping charges on returned material must be prepaid by the Buyer. Seller is in no event liable for consequential damages, installation cost or other costs of any nature as a result of the use of the products manufactured by the Seller, whether used in accordance with instructions or not.

QUOTATIONS—Only written quotations are valid.

CREDIT APPROVAL—Orders are subject to the approval of Seller's Credit Department and will be shipped C.O.D. unless open account credit has been established.

PRICES—Prices listed are F.O.B. Seller's plant in Waco, Texas, and are subject to change without notice. Terms are net 30 days from date of invoice. Prices do not include Federal, State or Local sales or excise taxes. Prices include packing suitable for domestic shipment. Export packing is extra.

SPECIFICATION CHANGES—All designs and specifications of Seller's products are subject to change without notice provided the changes do not materially affect performance.

SHIPMENTS—Shipments are made with transportation charges collect unless otherwise specified by the Buyer. Buyer's routing is used where practicable. Shipments are routed according to Seller's best judgment unless carrier is specified by Buyer. The Seller is not held responsible for selecting cheapest or fastest routing.

RETURNED MATERIAL—Written authorization must be obtained before returning material. Credit not exceeding 80% of the original price is allowed on unused material provided it is returned prepaid and in new condition. In no case will Seller authorize return of material more than ninety days after shipment from Seller's plant. Credit for returned material is issued by the Seller only to the original purchaser.

CLAIMS FOR SHORTAGES—Claims for shortages must be made within thirty days after date of shipment of material from Seller's plant.

CLAIMS FOR DAMAGE OR LOSS IN TRANSIT—Claims for damage or loss while material is in transit must be made immediately against the carrier by the Buyer.

DELAYS OR INABILITY TO PERFORM—The Seller is not liable for delays or inability to fulfill contractural obligations when the causes thereof are beyond the reasonable control of the Seller.

CANCELLATION OR CHANGES IN ORDERS—Cancellation of, or changes to, acknowledged orders by the Buyer are accepted only upon terms that protect Seller against loss.

WACOM PRODUCTS INC.

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Printed in U.S.A

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WACOM PRODUCTS

BANDPASS CAVITIES

WP-408
30-50 MHz

ADJUSTABLE SELECTIVITY
POWER: TO 350 WATTS

THESE HIGH Q COAXIAL CAVITY FILTERS are high performance models designed for use in systems which require greater selectivity than that provided by smaller diameter filters. The superiority of these high performance models is particularly noticeable when the frequency to be attenuated is relatively close to the frequency to be passed. These bandpass cavities are designed for use between the antenna and the receiver, or between the antenna and the transmitter, to reduce interference which is frequency rejectionable.

MODEL WP-408 is an 8" OD one-quarter wavelength cavity designed for use with transmitters or receivers operating in the low band. Four models, each with a tuning range of approximately 5 MHz, cover the 30-50 MHz band. Model WP-408A will tune the 30-35 MHz band, WP-408B will tune the 35-40 MHz band, WP-408C will tune the 40-45 MHz band and WP-408D will tune the 45-50 MHz band. It is available as a single cavity or as a multiple cavity combination. The multiple cavity models are supplied with interconnect cables and all models are supplied with mounting brackets and rails.

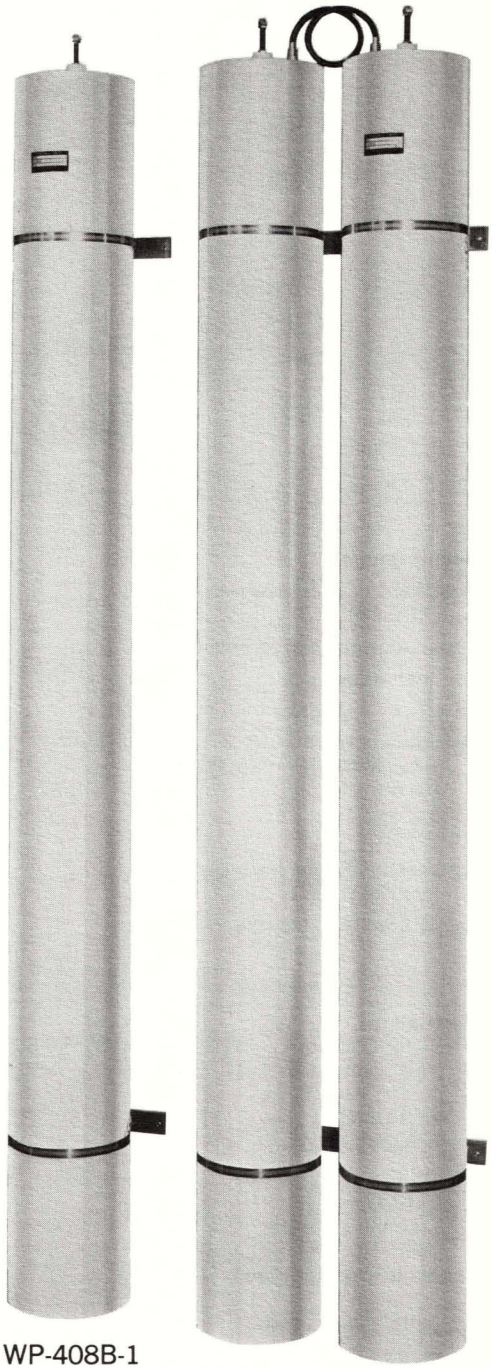
FREQUENCY STABILITY of the cavity is excellent. Since the resonant frequency of the cavity is determined by the length of the cavity center conductor, a threaded rod of "Invar", a metal with nearly zero coefficient of expansion, is used to control the center conductor length. The cavity will remain tuned over a wide temperature range.

TUNING: The tuning of the cavity is relatively simple—only basic measuring equipment is required. The cavity can be tuned to any frequency within its operating band by rotating the threaded tuning rod which varies the length of the center coaxial conductor.

ADJUSTABLE SELECTIVITY is provided by the rotatable coupling loops on the front of each cavity. The loops can be turned to positions corresponding to an overall insertion loss of ½ dB, 1 dB or 2 dB for each cavity. An increase in insertion loss will result in increased selectivity response. The rotatable loops provide the means for adjusting the selectivity response to the level required to reduce or eliminate interference, with minimum insertion loss at the desired frequency.

CONSTRUCTION: The end-plates and outer conductor, made of chromated aluminum, are heliarc welded for improved conductivity. Coupling loops are made of copper; both sections of the cavity center conductor are made of silver plated copper. The tuning rod is made of Invar. Quality materials are used throughout the cavity to assure top performance and long life. Galvanic corrosion is minimized by the use of similar materials and by passivating dissimilar materials which are in contact.

INSTALLATION of the cavity is simple and straight forward. It can be mounted in any position near the transmitter or receiver. The cavity is a passive device which requires no maintenance. For outdoor installation, a weatherproof housing must be used.



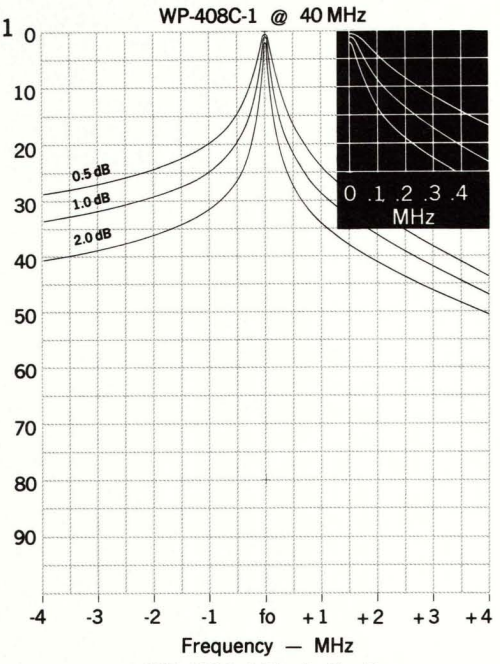
WP-408B-1
SINGLE CAVITY

WP-408B-2
DUAL CAVITY

Printed in U.S.A.—6-88

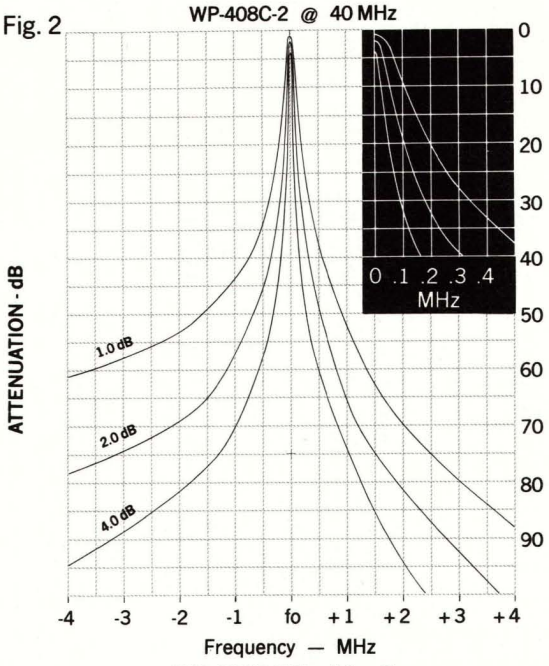
TYPICAL SELECTIVITY CHARACTERISTICS

Fig. 1



WP-408C-1 Single Cavity

Fig. 2



WP-408C-2 Dual Cavity

ELECTRICAL DATA

	WP-408A-1	WP-408B-1	WP-408C-1	WP-408D-1	WP-408B-2
Tuning Range	30-35 MHz	35-40 MHz	40-45 MHz	45-50 MHz	35-40 MHz
Insertion Loss (desired frequency)	Adjustable — 0.5 to 2.0 dB	Adjustable — 0.5 to 2.0 dB	Adjustable — 0.5 to 2.0 dB	Adjustable — 0.5 to 2.0 dB	Adjustable — 1.0 to 4.0 dB
Attenuation (undesired frequency)	See Fig. 1	See Fig. 1	See Fig. 1	See Fig. 1	See Fig. 2
Nominal Impedance	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms
VSWR at Resonance (maximum)	1.5 to 1	1.5 to 1	1.5 to 1	1.5 to 1	1.5 to 1
Maximum power input (continuous duty) with insertion loss per cavity at:					
0.5 dB	350 watts	350 watts	350 watts	350 watts	350 watts
1.0 dB	250 watts	250 watts	250 watts	250 watts	250 watts
2.0 dB	150 watts	150 watts	150 watts	150 watts	150 watts
Temperature Range (for negligible frequency shift)	−30° to +60°C	−30° to +60°C	−30° to +60°C	−30° to +60°C	−30° to +60°C
Cavity Electrical Length	¼ wavelength	¼ wavelength	¼ wavelength	¼ wavelength	¼ wavelength

MECHANICAL DATA

Materials:	**WP-408A-1**	**WP-408B-1**	**WP-408C-1**	**WP-408D-1**	**WP-408B-2**
Outer Conductor	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Inner Conductor	Silver plated copper	Silver plated copper	Silver plated copper	Silver plated copper	Silver plated copper
Tuning Rod	Invar	Invar	Invar	Invar	Invar
End Plates	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Coupling Loops	Copper	Copper	Copper	Copper	Copper
Dimensions:					
Individual Cavity	8" dia.x80"	8" dia.x80"	8" dia.x80"	8" dia.x72"	8" dia.x80"
Maximum, outside (with tuning rod extended)	8"x9"x91"	8"x9"x91"	8"x9"x91"	8"x9"x82"	9"x19"x91"
Connector Terminations	UHF female (Type N optional)	UHF female (Type N optional)	UHF female (Type N optional)	UHF female (Type N optional)	UHF female (Type N optional)
Finish	Gray Enamel	Gray Enamel	Gray Enamel	Gray Enamel	Gray Enamel
Net Weight	28 lbs.	25 lbs.	25 lbs.	23 lbs.	50 lbs.
Shipping Weight	40 lbs.	37 lbs.	37 lbs.	35 lbs.	78 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-408 (A, B, C or D)-1 Single cavity tuned to ___ MHz.
Model WP-408 (A, B, C or D)-2 Dual cavity tuned to ___ MHz.
Model WP-408 (A, B, C or D)-3 Triple cavity tuned to ___ MHz.

OPTIONS: If desired, the cavities can be supplied with Type N female connectors. Same price. Specify "with Type N female connectors" after model number.

WACOM PRODUCTS

BANDPASS CAVITIES

WP-409
30-50 MHz

ADJUSTABLE SELECTIVITY
POWER: TO 350 WATTS

THESE HIGH Q COAXIAL CAVITY FILTERS are high performance models designed for use in systems which require greater selectivity than that provided by smaller diameter filters. The superiority of these high performance models is particularly noticeable when the frequency to be attenuated is relatively close to the frequency to be passed. These bandpass cavities are designed for use between the antenna and the receiver, or between the antenna and the transmitter, to reduce interference which is frequency rejectionable.

MODEL WP-409 is a 10" OD one-quarter wavelength cavity designed for use with transmitters or receivers operating in the low band. Four models, each with a tuning range of approximately 5 MHz, cover the 30-50 MHz band. Model WP-409A will tune the 30-35 MHz band, WP-409B will tune the 35-40 MHz band, WP-409C will tune the 40-45 MHz band and WP-409D will tune the 45-50 MHz band. It is available as a single cavity or as a multiple cavity combination. The multiple cavity models are supplied with interconnect cables and all models are supplied with mounting brackets and rails.

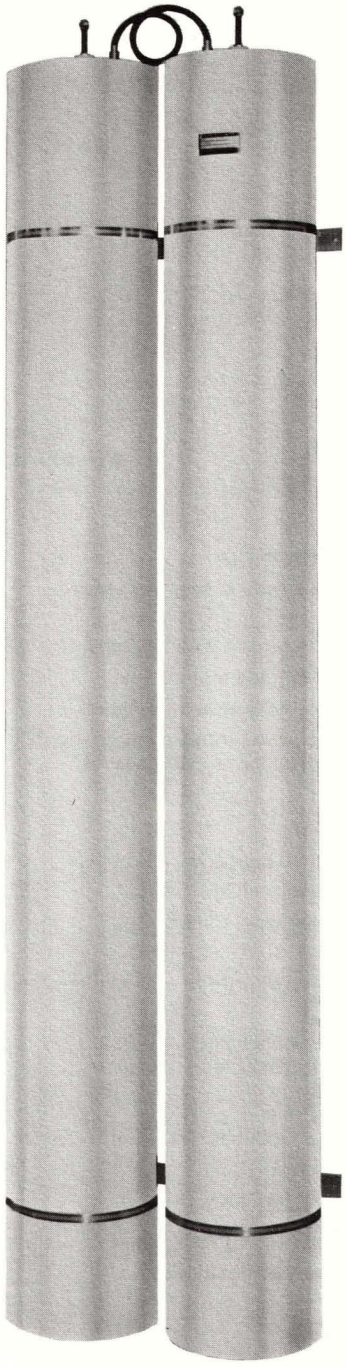
CONSTRUCTION: The end-plates and outer conductor, made of chromated aluminum, are heliarc welded for improved conductivity. Coupling loops are made of copper; both sections of the cavity center conductor are made of silver plated copper. The tuning rod is made of Invar. Quality materials are used throughout the cavity to assure top performance and long life. Galvanic corrosion is minimized by the use of similar materials and by passivating dissimilar materials which are in contact.

ADJUSTABLE SELECTIVITY is provided by the rotatable coupling loops on the front of each cavity. The loops can be turned to positions corresponding to an overall insertion loss of ½ dB, 1 dB or 2 dB for each cavity. An increase in insertion loss will result in increased selectivity response. The rotatable loops provide the means for adjusting the selectivity response to the level required to reduce or eliminate interference, with minimum insertion loss at the desired frequency.

FREQUENCY STABILITY of the cavity is excellent. Since the resonant frequency of the cavity is determined by the length of the cavity center conductor, a threaded rod of "Invar", a metal with nearly zero coefficient of expansion, is used to control the center conductor length. The cavity will remain tuned over a wide temperature range.

TUNING: The tuning of the cavity is relatively simple—only basic measuring equipment is required. The cavity can be tuned to any frequency within its operating band by rotating the threaded tuning rod which varies the length of the center coaxial conductor.

INSTALLATION of the cavity is simple and straight forward. It can be mounted in any position near the transmitter or receiver. The cavity is a passive device which requires no maintenance. For outdoor installation, a weatherproof housing must be used.

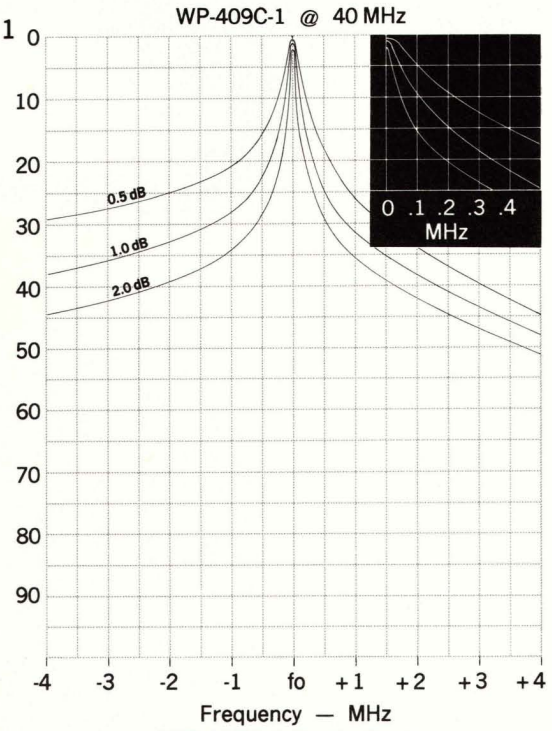


WP-409B-2
DUAL CAVITY

Printed in U.S.A.—6-88

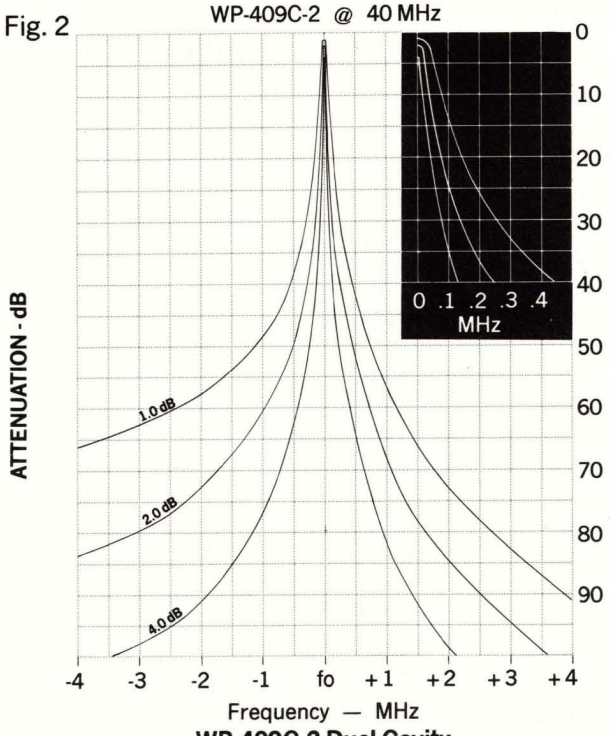
TYPICAL SELECTIVITY CHARACTERISTICS

Fig. 1



WP-409C-1 Single Cavity

Fig. 2



WP-409C-2 Dual Cavity

ELECTRICAL DATA

	WP-409A-1	WP-409B-1	WP-409C-1	WP-409D-1	WP-409B-2
Tuning Range	30-35 MHz	35-40 MHz	40-45 MHz	45-50 MHz	35-40 MHz
Insertion Loss (desired frequency)	Adjustable — 0.5 to 2.0 dB	Adjustable — 0.5 to 2.0 dB	Adjustable — 0.5 to 2.0 dB	Adjustable — 0.5 to 2.0 dB	Adjustable — 1.0 to 4.0 dB
Attenuation (undesired frequency)	See Fig. 1	See Fig. 1	See Fig. 1	See Fig. 1	See Fig. 2
Nominal Impedance	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms
VSWR at Resonance (maximum)	1.5 to 1	1.5 to 1	1.5 to 1	1.5 to 1	1.5 to 1
Maximum power input (continuous duty) with insertion loss per cavity at:					
0.5 dB	350 watts	350 watts	350 watts	350 watts	350 watts
1.0 dB	250 watts	250 watts	250 watts	250 watts	250 watts
2.0 dB	150 watts	150 watts	150 watts	150 watts	150 watts
Temperature Range (for negligible frequency shift)	−30° to +60°C	−30° to +60°C	−30° to +60°C	−30° to +60°C	−30° to +60°C
Cavity Electrical Length	¼ wavelength	¼ wavelength	¼ wavelength	¼ wavelength	¼ wavelength

MECHANICAL DATA

Materials:	WP-409A-1	WP-409B-1	WP-409C-1	WP-409D-1	WP-409B-2
Outer Conductor	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Inner Conductor	Silver plated copper	Silver plated copper	Silver plated copper	Silver plated copper	Silver plated copper
Tuning Rod	Invar	Invar	Invar	Invar	Invar
End Plates	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Coupling Loops	Copper	Copper	Copper	Copper	Copper
Dimensions:					
Individual Cavity	10" dia.x80"	10" dia.x80"	10" dia.x80"	10" dia.x72"	10" dia.x80"
Maximum, outside (with tuning rod extended)	10"x11"x91"	10"x11"x91"	10"x11"x91"	10"x11"x82"	11"x21"x91"
Connector Terminations	UHF female (Type N optional)	UHF female (Type N optional)	UHF female (Type N optional)	UHF female (Type N optional)	UHF female (Type N optional)
Finish	Gray Enamel	Gray Enamel	Gray Enamel	Gray Enamel	Gray Enamel
Net Weight	32 lbs.	29 lbs.	29 lbs.	27 lbs.	58 lbs.
Shipping Weight	44 lbs.	41 lbs.	41 lbs.	39 lbs.	87 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-409 (A, B, C or D)-1 Single cavity tuned to ___ MHz.
Model WP-409 (A, B, C or D)-2 Dual cavity tuned to ___ MHz.
Model WP-409 (A, B, C or D)-3 Triple cavity tuned to ___ MHz.

OPTIONS: If desired, the cavities can be supplied with Type N female connectors. Same price. Specify "with Type N female connectors" after model number.

WACOM PRODUCTS

BANDPASS CAVITIES

WP-410

66-88 MHz

ADJUSTABLE SELECTIVITY

POWER: TO 350 WATTS

WP-410-1

WP-410-2

WP-410-3

Model WP-410 is a high Q, ¼ wavelength coaxial cavity filter designed for use with transmitters or receivers in the 66-88 MHz band. Three models, each with a tuning range of 10 MHz, are available to cover the 66-88 MHz band. The cavity is available in single, dual and triple cavity combinations. The dual and triple cavity models are supplied with interconnecting cables and mounting rails.

APPLICATION: This bandpass cavity is particularly suitable for use with radio systems in large metropolitan areas and/or other frequency congested areas because of the overall protection it provides. The cavity is helpful in reducing or eliminating all types of interference that is frequency rejectionable, i.e., transmitter produced intermodulation interference, receiver produced intermod, transmitter spurious radiations, receiver desensitization. When installed between the antenna and transmitter, the cavity will reduce the spurious output of the transmitter and reduce unwanted "off-frequency" signals from entering the final stages of the transmitter. When installed between the antenna and receiver, the cavity will improve the selectivity of the receiver making it less susceptible to desensitization and/or intermod interference from transmitters in the area. The additional selectivity provided by the cavity is achieved where it is most needed—in the front-end circuits of the receiver.

TUNING: The tuning of the cavity is relatively simple —only basic measuring equipment is required. The cavity can be tuned to any frequency within its operating band by rotating the threaded tuning rod which varies the length of the center coaxial conductor.

ADJUSTABLE SELECTIVITY is provided by the rotatable coupling loops on the front of each cavity. The loops can be turned to positions corresponding to an overall insertion loss of ½ dB, 1 dB or 2 dB for each cavity. An increase in insertion loss will result in increased selectivity response. The rotatable loops provide the means for adjusting the selectivity response to the level required to reduce or eliminate the interference, with minimum insertion loss at the desired frequency.

CONSTRUCTION: To assure top performance and long life, quality materials are used throughout the cavity. End plates and outer conductor are made of chromated aluminum, coupling loops are made of copper, both sections of the center conductor are made of silver plated copper. Galvanic corrosion is minimized by the use of similar materials or by passivating the dissimilar materials in contact. Tough and durable, the cavity will withstand rough handling.

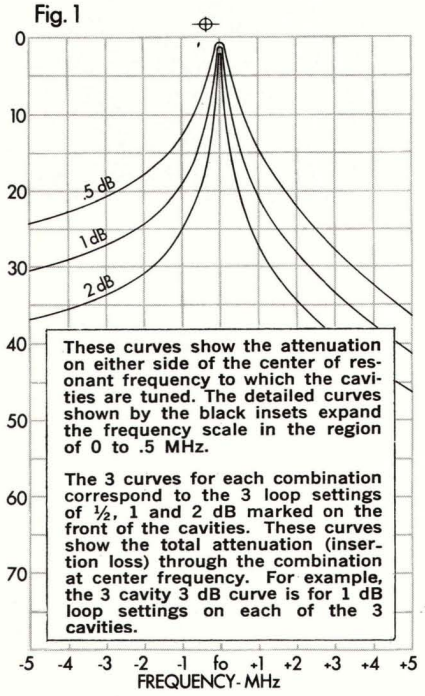
FREQUENCY STABILITY of the cavity is excellent. Since the resonant frequency of the cavity is determined by the length of the cavity center conductor, a threaded rod of "Invar", a metal with nearly zero coefficient of expansion, is used to control the center conductor length. The cavity will remain tuned over an extremely wide temperature range.

INSTALLATION of the cavity is simple and straight forward. It can be mounted in any position near the transmitter or receiver. The cavity is a passive device which requires no maintenance. For outdoor installations, a weatherproof housing should be used.

Printed in USA—8-85

TYPICAL SELECTIVITY CHARACTERISTICS

Fig. 1

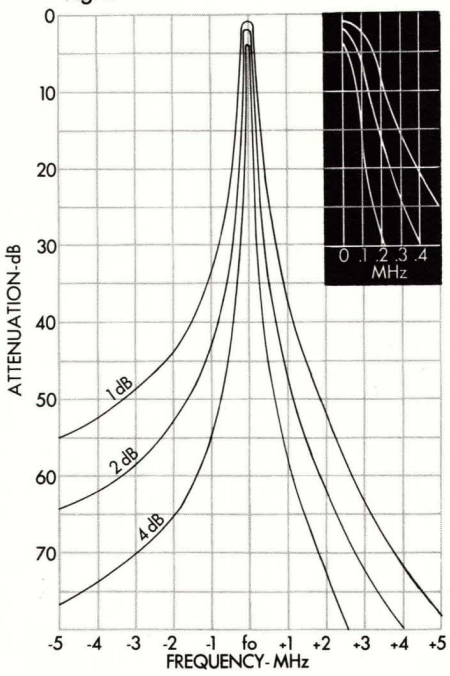


These curves show the attenuation on either side of the center of resonant frequency to which the cavities are tuned. The detailed curves shown by the black insets expand the frequency scale in the region of 0 to .5 MHz.

The 3 curves for each combination correspond to the 3 loop settings of ½, 1 and 2 dB marked on the front of the cavities. These curves show the total attenuation (insertion loss) through the combination at center frequency. For example, the 3 cavity 3 dB curve is for 1 dB loop settings on each of the 3 cavities.

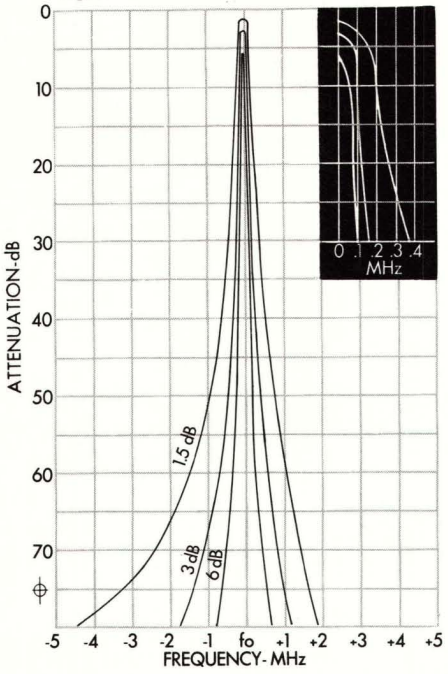
WP-410-1 SINGLE CAVITY

Fig. 2



WP-410-2 DUAL CAVITY

Fig. 3



WP-410-3 TRIPLE CAVITY

ELECTRICAL DATA

	Model WP-410-1	Model WP-410-2	WP-410-3
Tuning Range A Range	66-76 MHz	66-76 MHz	66-76 MHz
B Range	70-80 MHz	70-80 MHz	70-80 MHz
C Range	78-88 MHz	78-88 MHz	78-88 MHz
Insertion Loss (desired frequency)	Adjustable— 0.5 to 2.0 dB	Adjustable— 1.0 to 4.0 dB	Adjustable— 1.5 to 6 dB
Attenuation (undesired frequency)	See Fig. 1	See Fig. 2	See Fig. 3
Nominal Impedance	50 ohms	50 ohms	50 ohms
VSWR at Resonance (maximum)	1.5 to 1	1.5 to 1	1.5 to 1
Maximum power input (continuous duty) with insertion loss per cavity at:			
0.5 dB	350 watts	350 watts	350 watts
1.0 dB	250 watts	250 watts	250 watts
2.0 dB	150 watts	150 watts	150 watts
Temperature Range (for negligible frequency shift)	– 30° to + 60°C	– 30° to + 60°C	– 30° to + 60°C
Cavity Electrical Length	¼ wavelength	¼ wavelength	¼ wavelength

MECHANICAL DATA

	Model WP-410-1	WP-410-2	WP-410-3
Materials:			
Outer Conductor	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Inner Conductor	Silver plated copper	Silver plated copper	Silver plated copper
Tuning Rod	Invar	Invar	Invar
End Plates	A-380 Aluminum	A-380 Aluminum	A-380 Aluminum
Coupling Loops	Copper	Copper	Copper
Dimensions:			
Individual Cavity	5″ OD by 48″ (A range), or 45″ (B range), or 42″ (C range)		
Maximum, outside (with tuning rod extended)	7″ x 6″ x 62″	7″ x 13″ x 62″	7″ x 19″ x 62″
Connector Terminations	UHF female	UHF female	UHF female
Finish	Gray enamel	Gray enamel	Gray enamel
Net Weight	9 lbs.	20 lbs.	30 lbs.
Shipping Weight	17 lbs.	36 lbs.	47 lbs.

ORDERING INFORMATION

Model WP-410 (A, B or C)-1 Single cavity tuned to_____MHz.
Model WP-410 (A, B or C)-2 Dual cavity tuned to_____MHz.
Model WP-410 (A, B or C)-3 Triple cavity tuned to_____MHz.

OPTIONS: If desired, the cavities can be supplied with Type N female connectors. Same price. Specify "with Type N female connectors" after model number.

WACOM PRODUCTS

WACOM PRODUCTS

BANDPASS CAVITIES

WP-420

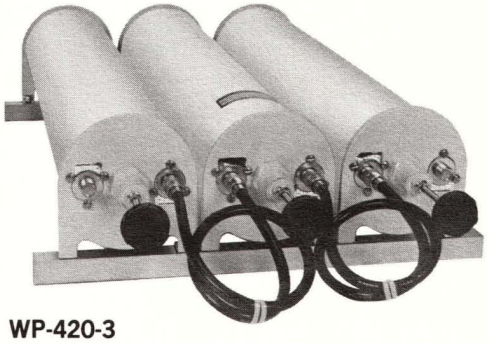
118-144 MHz

ADJUSTABLE SELECTIVITY

POWER: TO 350 WATTS

WP-420-1

WP-420-2



WP-420-3

Model WP-420 is a high Q, ¼ wavelength coaxial cavity filter designed for use with transmitters or receiver in the 118-144 MHz band. The cavity is available in single, dual and triple cavity combinations. The dual and triple cavity models are supplied with interconnecting cables and mounting rails.

APPLICATION: This bandpass cavity is particularly suitable for use with radio systems in large metropolitan areas and/or other frequency congrested areas because of the overall protection it provides. The cavity is helpful in reducing or eliminating all types of interference that is frequency rejectionable, i.e., transmitter produced intermodulation interference, receiver produced intermod, transmitter spurious radiations, receiver desensitization. When installed between the antenna and transmitter, the cavity will reduce the spurious output of the transmitter and reduce unwanted "off-frequency" signals from entering the final stages of the transmitter. When installed between the antenna and receiver, the cavity will improve the selectivity of the receiver making it less susceptible to desensitization and/or intermod interference from transmitters in the area. The additional selectivity provided by the cavity is achieved where it is most needed—in the front-end circuits of the receiver.

TUNING: The tuning of the cavity is relatively simple —only basic measuring equipment is required. The cavity can be tuned to any frequency within its operating band by rotating the threaded tuning rod which varies the length of the center coaxical conductor.

ADJUSTABLE SELECTIVITY is provided by the rotatable coupling loops on the front of each cavity. The loops can be turned to positions corresponding to an overall insertion loss of ½ dB, 1 dB or 2 dB for each cavity. An increase in insertion loss will result in increased selectivity response. The rotatable loops provide the means for adjusting the selectivity response to the level required to reduce or eliminate the interference, with minimum insertion loss at the desired frequency.

CONSTRUCTION: To assure top performance and long life, quality materials are used throughout the cavity. End plates and outer conductor are made of chromated aluminum, coupling loops are made of copper, both sections of the center conductor are made of silver plated copper. Galvanic corrosion is minimized by the use of similar materials or by passivating the dissimilar materials in contact. Tough and durable, the cavity will withstand rough handling.

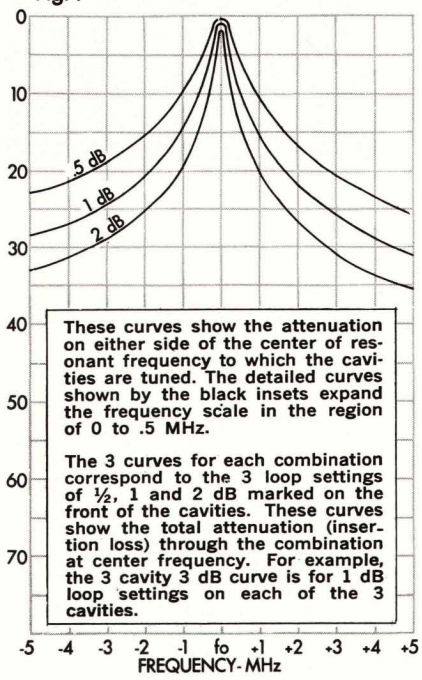
FREQUENCY STABILITY of the cavity is excellent. Since the resonant frequency of the cavity is determined by the length of the cavity center conductor, a threaded rod of "Invar", a metal with nearly zero coefficient of expansion, is used to control the center conductor length. The cavity will remain tuned over an extremely wide temperature range.

INSTALLATION of the cavity is simple and straight forward. It can be mounted in any position near the transmitter or receiver. The cavity is a passive device which requires no maintenance. For outdoor installations. a weatherproof housing should be used.

Printed in USA—6-83

TYPICAL SELECTIVITY CHARACTERISTICS

Fig. 1

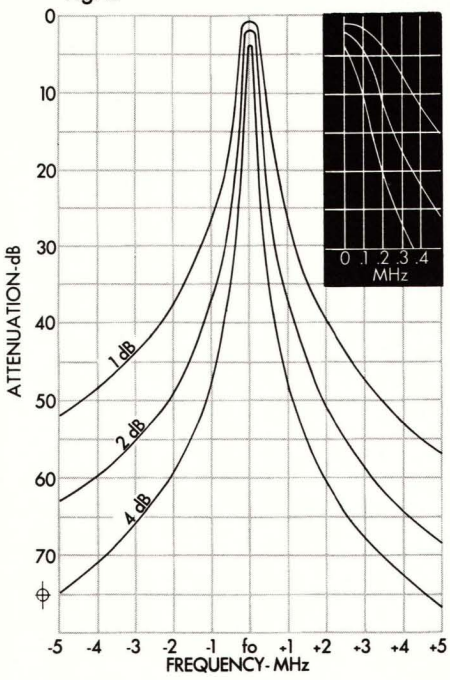


These curves show the attenuation on either side of the center of resonant frequency to which the cavities are tuned. The detailed curves shown by the black insets expand the frequency scale in the region of 0 to .5 MHz.

The 3 curves for each combination correspond to the 3 loop settings of ½, 1 and 2 dB marked on the front of the cavities. These curves show the total attenuation (insertion loss) through the combination at center frequency. For example, the 3 cavity 3 dB curve is for 1 dB loop settings on each of the 3 cavities.

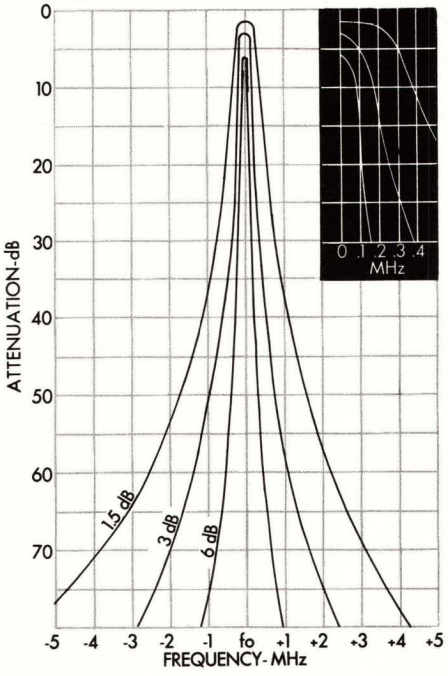
WP-420-1 SINGLE CAVITY

Fig. 2



WP-420-2 DUAL CAVITY

Fig. 3



WP-420-3 TRIPLE CAVITY

ELECTRICAL DATA

	WP-420-1	WP-420-2	WP-420-3
Tuning Range			
A Range	118-130 MHz	118-130 MHz	118-130 MHz
B Range	130-144 MHz	130-144 MHz	130-144 MHz
Insertion Loss (desired frequency)	Adjustable— 0.5 to 2.0 dB	Adjustable— 1.0 to 4.0 dB	Adjustable— 1.5 to 6 dB
Attenuation (undesired frequency)	See Fig. 1	See Fig. 2	See Fig. 3
Nominal Impedance	50 ohms	50 ohms	50 ohms
VSWR at Resonance (maximum)	1.5 to 1	1.5 to 1	1.5 to 1
Maximum power input (continuous duty with insertion loss per cavity at:			
0.5 dB	350 watts	350 watts	350 watts
1.0 dB	250 watts	250 watts	250 watts
2.0 d.b	150 watts	150 watts	150 watts
Temperature Range (for negligible frequency shift)	– 30° to + 60°C	– 30° to + 60°C	– 30° to + 60°C
Cavity Electrical Length	¼ wavelength	¼ wavelength	¼ wavelength

MECHANICAL DATA

	WP-420-1	WP-420-2	WP-420-3
Materials:			
Outer Conductor	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Inner Conductor	Silver plated copper	Silver plated copper	Silver plated copper
Tuning Rod	Invar	Invar	Invar
End Plates	A-380 Aluminum	A-380 Aluminum	A-380 Aluminum
Coupling Loops	Copper	Copper	Copper
Dimensions:			
Individuai Cavity	5″ dia. x 27″	5″ dia. x 27″	5″ dia. x 27″
Maximum, outside (with tuning rod extended)	7″ x 6″ x 34″	7″ x 13″ x 34″	7″ x 19″ x 34″
Connector Terminations	UHF female	UHF female	UHF female
Finish	Gray enamel	Gray enamel	Gray enamel
Net Weight	7 lbs.	18 lbs.	27 lbs.
Shipping Weight	11 lbs.	31 lbs.	50 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-420-1 Single cavity tuned to_____MHz.

Model WP-420-2 Dual cavity tuned to _____MHz.

Model WP-420-3 Triple cavity tuned to _____MHz.

OPTIONS: If desired, the cavities can be supplied with Type N connectors. Same price. Specify "with Type N connectors" after model number.

WACOM PRODUCTS

BANDPASS CAVITIES

ADJUSTABLE SELECTIVITY

POWER: TO 350 WATTS

WP-429
118-144 MHz
WP-439
144-174 MHz

THESE HIGH Q COAXIAL CAVITY FILTERS are high performance models designed for use in systems which require greater selectivity than that provided by smaller diameter filters. The superiority of these high performance models is particularly noticeable when the frequency to be attenuated is relatively close to the frequency to be passed. These bandpass cavities are designed for use between the antenna and the receiver, or between the antenna and the transmitter, to reduce interference which is frequency rejectionable. Note that the cost of these models is substantially less than similar models constructed of copper and yet, the performance characteristics compare favorably.

MODEL WP-429 is a 10″ OD one-quarter wavelength coaxial cavity filter designed for use with transmitters or receivers operating in the 118-144 MHz band. The WP-429 "A Range" model covers the 118-136 MHz band; the WP-429 "B Range" model covers the 130-144 MHz band. It is available as a single cavity or as a multiple cavity combination. The multiple cavity models are supplied with interconnect cables and mounting rails.

MODEL WP-439 is a 10″ OD one-quarter wavelength cavity designed for use with transmitters or receivers operating in the 144-174 MHz band. It is available as a single cavity or as a multiple cavity combination. The multiple cavity models are supplied with interconnect cables and mounting rails. If desired, this model can be converted to a WP-539 notch filter, if the appropriate adaptor kit is purchased.

CONSTRUCTION: The end-plates and outer conductor, made of chromated aluminum, are heliarc welded for improved conductivity. Coupling loops are made of copper; both sections of the cavity center conductor are made of silver plated copper. The tuning rod is made of Invar. Quality materials are used throughout the cavity to assure top performance and long life. Galvanic corrosion is minimized by the use of similar materials and by passivating dissimilar materials which are in contact.

ADJUSTABLE SELECTIVITY is provided by the rotatable coupling loops on the front of each cavity. The loops can be turned to positions corresponding to an overall insertion loss of ½ dB, 1 dB or 2 dB for each cavity. An increase in insertion loss will result in increased selectivity response. The rotatable loops provide the means for adjusting the selectivity response to the level required to reduce or eliminate interference, with minimum insertion loss at the desired frequency.

FREQUENCY STABILITY of the cavity is excellent. Since the resonant frequency of the cavity is determined by the length of the cavity center conductor, a threaded rod of "Invar", a metal with nearly zero coefficient of expansion, is used to control the center conductor length. The cavity will remain tuned over a wide temperature range.

TUNING: The tuning of the cavity is relatively simple-only basic measuring equipment is required. The cavity can be tuned to any frequency within its operating band by rotating the threaded tuning rod which varies the length of the center coaxial conductor.

INSTALLATION of the cavity is simple and straight forward. It can be mounted in any position near the transmitter or receiver. The cavity is a passive device which requires no maintenance. For outdoor installation, a weatherproof housing must be used.

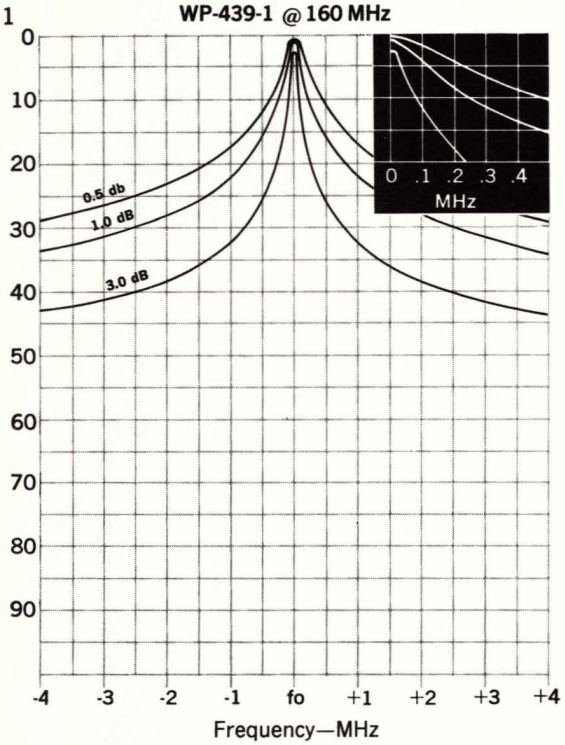
WP-439-1

WP-439-2

Printed in USA—12-85

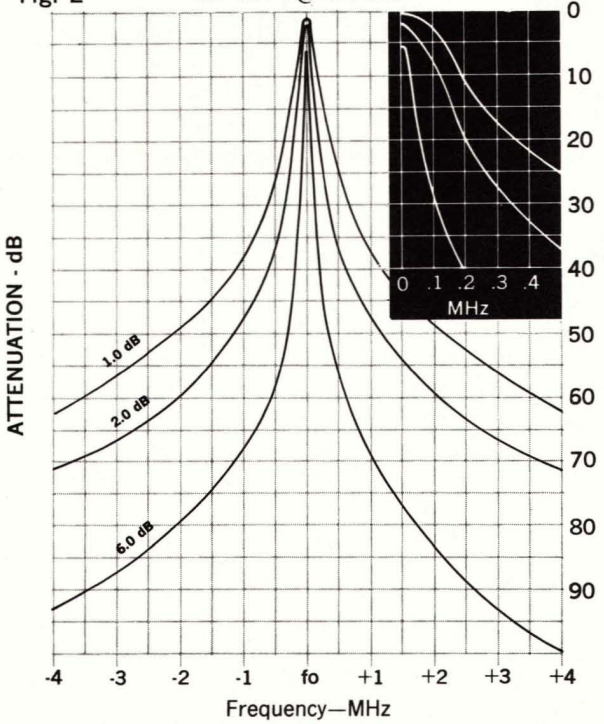
TYPICAL SELECTIVITY CHARACTERISTICS

Fig. 1



WP-439-1 Single Cavity

Fig. 2



WP-439-2 Dual Cavity

ELECTRICAL DATA

	WP-429-1	WP-429-2	WP-439-1	WP-439-2
Tuning Range . . . A Range	118-136 MHz	118-136 MHz	144-174 MHz	144-174 MHz
B Range	130-144 MHz	130-144 MHz		
Insertion Loss (desired frequency)	Adjustable—0.5 to 3.0 dB	Adjustable—1.0 to 6.0 dB	Adjustable—0.5 to 3.0 dB	Adjustable—1.0 to 6.0 dB
Attenuation (undesired frequency)	See Fig. 1	See Fig. 2	See Fig. 1	See Fig. 2
Nominal Impedance	50 ohms	50 ohms	50 ohms	50 ohms
VSWR at Resonance (maximum)	1.5 to 1	1.5 to 1	1.5 to 1	1.5 to 1
Maximum Power Input (continuous duty with insertion loss per cavity at:				
0.5 dB	350 watts	350 watts	350 watts	350 watts
1.0 dB	250 watts	250 watts	250 watts	250 watts
2.0 dB	150 watts	150 watts	150 watts	150 watts
Temperature Range (for negligible frequency shift)	– 30° to + 60°C	– 30° to + 60°C	– 30° to + 60°C	– 30° to + 60°C
Cavity Electrical Length	¼ wavelength	¼ wavelength	¼ wavelength	¼ wavelength

MECHANICAL DATA

Materials:	WP-429-1	WP-429-2	WP-439-1	WP-439-2
Outer Conductor	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Inner Conductor	Silver plated copper	Silver plated copper	Silver plated copper	Silver plated copper
Tuning Rod	Invar	Invar	Invar	Invar
End Plates	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Coupling Loops	Copper	Copper	Copper	Copper
Dimensions:				
Individual Cavity	10″ dia. x 30″	10″ dia. x 30″	10″ dia. x 25″	10″ dia. x 25″
Maximum, outside (with tuning rod extended)	10″ dia. x 38″	11″ x 22″ x 38″	10″ dia. x 33″	11″ x 22″ x 33″
Connector Terminations	UHF female (Type N optional)	UHF female (Type N optional)	UHF female (Type N optional)	UHF female (Type N optional)
Finish	Gray Enamel	Gray Enamel	Gray Enamel	Gray Enamel
Net Weight	12 lbs.	27 lbs.	10 lbs.	23 lbs.
Shipping Weight	18 lbs.	35 lbs.	16 lbs.	31 lbs.

ORDERING INFORMATION

Model WP-429-1 Single cavity tuned to_____MHz.
Model WP-429-2 Dual cavity tuned to_____MHz.
Model WP-439-1 Single cavity tuned to_____MHz.
Model WP-439-2 Dual cavity tuned to_____MHz.
Model WP-439-3 Triple cavity tuned to_____MHz.

OPTIONS: If desired, the cavities can be supplied with Type N female connectors. Same price. Specify "with Type N female connectors" after model number.

WACOM PRODUCTS

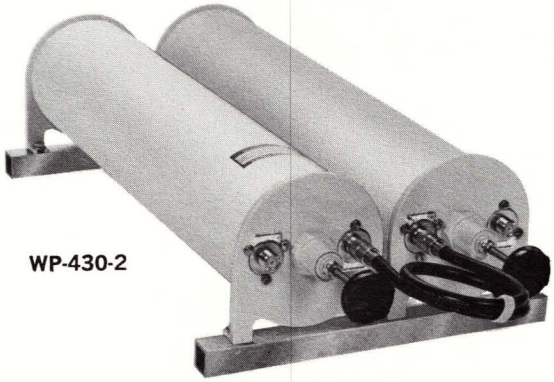
WACOM PRODUCTS

BANDPASS CAVITIES

WP-430
144-174 MHz

ADJUSTABLE SELECTIVITY
POWER: TO 350 WATTS

WP-430-1



WP-430-2

WP-430-3

MODEL WP-430 is a high Q, ¼ wavelength coaxial cavity filter designed for use with transmitters or receivers in the 144-174 MHz band. The cavity is available in single, dual and triple cavity combinations. The dual and triple cavity models are supplied with interconnecting cables and mounting rails.

APPLICATION: This bandpass cavity is particularly suitable for use with radio systems in large metropolitan areas and/or other frequency congested areas because of the overall protection it provides. The cavity is helpful in reducing or eliminating all types of interference that is frequency rejectionable, i.e., transmitter produced intermodulation interference, receiver produced intermod, transmitter spurious radiations, receiver desensitization. When installed between the antenna and transmitter, the cavity will reduce the spurious output of the transmitter and reduce unwanted "off-frequency" signals from entering the final stages of the transmitter. When installed between the antenna and receiver, the cavity will improve the selectivity of the receiver making it less susceptible to desensitization and/or intermod interference.

TUNING: The tuning of the cavity is relatively simple —only basic measuring equipment is required. The cavity can be tuned to any frequency within its operating band by rotating the threaded tuning rod which varies the length of the center coaxical conductor.

ADJUSTABLE SELECTIVITY is provided by the rotatable coupling loops on the front of each cavity. The loops can be turned to positions corresponding to an overall insertion loss of ½ dB, 1 dB or 2 dB for each cavity. An increase in insertion loss will result in increased selectivity response. The rotatable loops provide the means for adjusting the selectivity response to the level required to reduce or eliminate the interference, with minimum insertion loss at the desired frequency.

CONSTRUCTION: To assure top performance and long life, quality materials are used throughout the cavity. End plates and outer conductor are made of chromated aluminum, coupling loops are made of copper, both sections of the center conductor are made of silver plated copper. Galvanic corrosion is minimized by the use of similar materials or by passivating the dissimilar materials in contact. Tough and durable, the cavity will withstand rough handling.

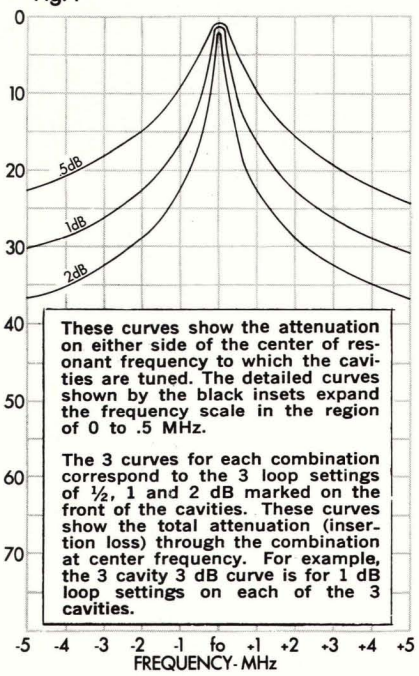
FREQUENCY STABILITY of the cavity is excellent. Since the resonant frequency of the cavity is determined by the length of the cavity center conductor, a threaded rod of "Invar", a metal with nearly zero coefficient of expansion, is used to control the center conductor length. The cavity will remain tuned over an extremely wide temperature range.

INSTALLATION of the cavity is simple and straight forward. It can be mounted in any position near the transmitter or receiver. The cavity is a passive device which requires no maintenance. For outdoor installations, a weatherproof housing should be used.

Printed in USA—6-83

TYPICAL SELECTIVITY CHARACTERISTICS

Fig. 1

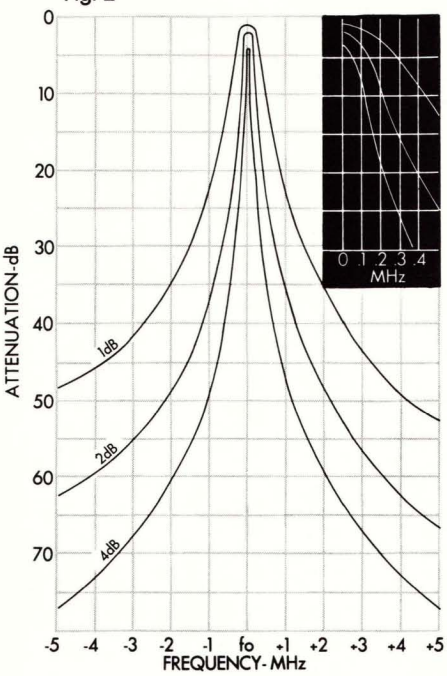


These curves show the attenuation on either side of the center of resonant frequency to which the cavities are tuned. The detailed curves shown by the black insets expand the frequency scale in the region of 0 to .5 MHz.

The 3 curves for each combination correspond to the 3 loop settings of ½, 1 and 2 dB marked on the front of the cavities. These curves show the total attenuation (insertion loss) through the combination at center frequency. For example, the 3 cavity 3 dB curve is for 1 dB loop settings on each of the 3 cavities.

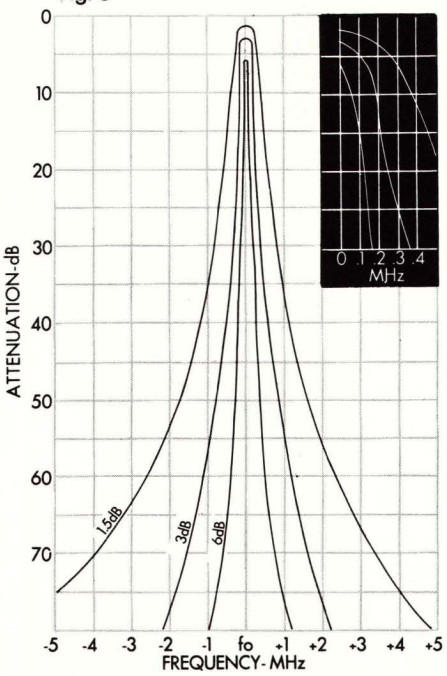
WP-430-1 SINGLE CAVITY

Fig. 2



WP-430-2 DUAL CAVITY

Fig. 3



WP-430-3 TRIPLE CAVITY

ELECTRICAL DATA

	WP-430-1	WP-430-2	WP-430-3
Tuning Range	144-174 MHz	144-174 MHz	144-174 MHz
Insertion Loss (desired frequency)	Adjustable— 0.5 to 2.0 dB	Adjustable— 1.0 to 4.0 dB	Adjustable— 1.5 to 6 dB
Attenuation (undesired frequency)	See Fig. 1	See Fig. 2	See Fig. 3
Nominal Impedance	50 ohms	50 ohms	50 ohms
VSWR at Resonance (maximum)	1.5 to 1	1.5 to 1	1.5 to 1
Maximum power input (continuous duty) with insertion loss per cavity at:			
0.5 dB	350 watts	350 watts	350 watts
1.0 dB	250 watts	250 watts	250 watts
2.0 dB	150 watts	150 watts	150 watts
Temperature Range (for negligible frequency shift)	—30° to +60°C	—30° to +60°C	—30° to +60°C
Cavity Electrical Length	¼ wavelength	¼ wavelength	¼ wavelength

MECHANICAL DATA

	WP-430-1	WP-430-2	WP-430-3
Materials:			
Outer Conductor	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Inner Conductor	Silver plated copper	Silver plated copper	Silver plated copper
Tuning Rod	Invar	Invar	Invar
End Plates	A-380 Aluminum	A-380 Aluminum	A-380 Aluminum
Coupling Loops	Copper	Copper	Copper
Dimensions:			
Individual Cavity	5" dia. x 23"	5" dia. x 23"	5" dia. x 23"
Maximum, outside (with tuning rod extended)	7" x 6" x 29"	7" x 13" x 29"	7" x 19" x 29"
Connector Terminations	UHF female	UHF female	UHF female
Finish	Gray enamel	Gray enamel	Gray enamel
Net Weight	5 lbs.	13 lbs.	20 lbs.
Shipping Weight	8.5 lbs.	18 lbs.	25 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-430-1 Single cavity tuned to _____ MHz.
Model WP-430-2 Dual cavity tuned to _____ MHz.
Model WP-430-3 Triple cavity tuned to _____ MHz.

OPTIONS: If desired, the cavities can be supplied with Type N female connectors. Same price. Specify "with Type N female connectors" after model number.

BANDPASS CAVITIES

WP-469
406-420 MHz

WP-479
450-512 MHz

ADJUSTABLE SELECTIVITY

POWER: TO 350 WATTS

THESE HIGH Q COAXIAL CAVITY FILTERS are high performance models designed for use in systems which require greater selectivity than that provided by smaller diameter filters. The superiority of these high performance models is particularly noticeable when the frequency to be attenuated is relatively close to the frequency to be passed. These bandpass cavities are designed for use between the antenna and the receiver, or between the antenna and the transmitter, to reduce interference which is frequency rejectionable. Note that the cost of these models is substantially less than similar models constructed of copper and yet, the performance characteristics compare favorably.

WP-479-1

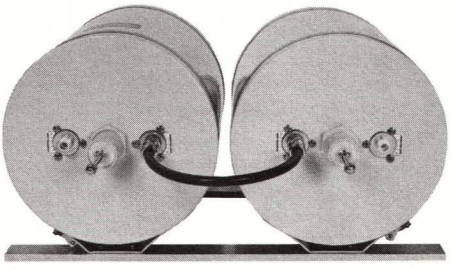
MODEL WP-469 is a 10″ OD one-quarter wavelength coaxial cavity filter designed for use with transmitters or receivers operating in the 406-420 MHz band. It is available as a single cavity or as a multiple cavity combination. The multiple cavity models are supplied with interconnect cables and mounting rails.

MODEL WP-479 is a 10″ OD one-quarter wavelength coaxial cavity designed for use with transmitters or receivers operating in the 450-512 MHz band. It is available as a single cavity or as a multiple cavity combination. The multiple cavity models are supplied with interconnect cables and mounting rails. If desired this model can be converted to a WP-579 notch filter, if the appropriate adaptor kit is purchased.

WP-479-2

CONSTRUCTION: The end-plates and outer conductor, made of chromated aluminum, are heliarc welded for improved conductivity. Coupling loops are made of copper; both sections of the cavity center conductor are made of silver plated copper. The tuning rod is made of Invar. Quality materials are used throughout the cavity to assure top performance and long life. Galvanic corrosion is minimized by the use of similar materials and by passivating dissimilar materials which are in contact.

ADJUSTABLE SELECTIVITY is provided by the rotatable coupling loops on the front of each cavity. The loops can be tuned to positions corresponding to an overall insertion loss of ½ dB, 1 dB or 2 dB for each cavity. An increase in insertion loss will result in increased selectivity response. The rotatable loops provide the means for adjusting the selectivity response to the level required to reduce or eliminate interference, with minimum insertion loss at the desired frequency.



TOP VIEW

FREQUENCY STABILITY of the cavity is excellent. Since the resonant frequency of the cavity is determined by the length of the cavity center conductor, a threaded rod of "Invar", a metal with nearly zero coefficient of expansion, is used to control the center conductor length. The cavity will remain tuned over a wide temperature range.

TUNING: The tuning of the cavity is relatively simple-only basic measuring equipment is required. The cavity can be tuned to any frequency within its operating band by rotating the threaded tuning rod which varies the length of the center coaxial conductor.

Printed in USA—6-83

TYPICAL SELECTIVITY CHARACTERISTICS

Fig. 1 WP-479-1 @ 460 MHz

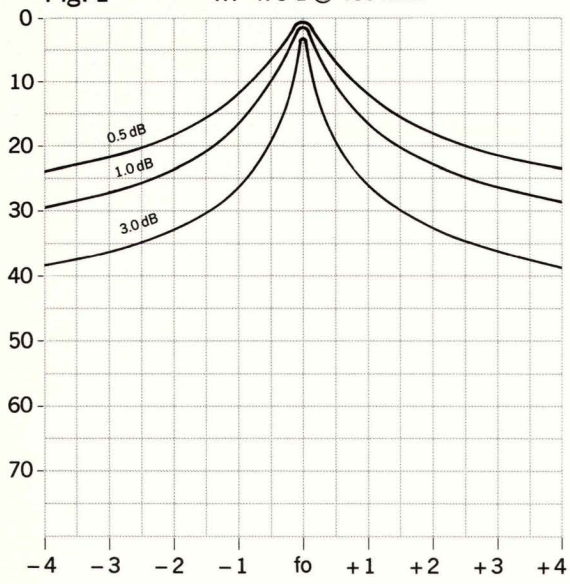
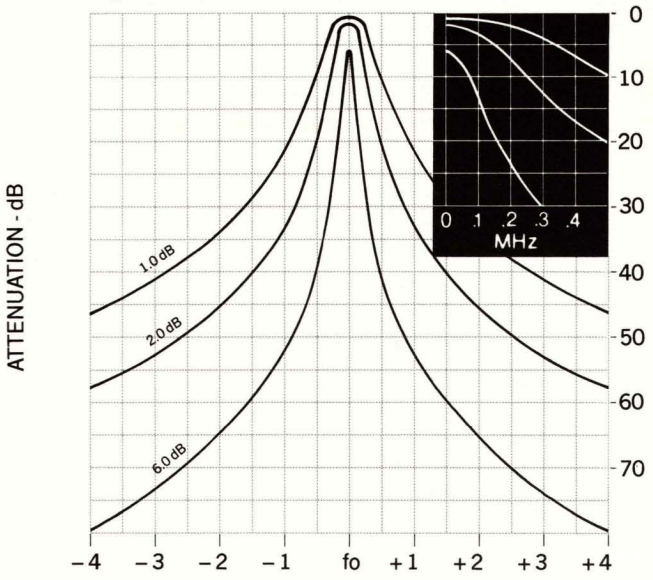


Fig. 2 WP-479-2 @ 460 MHz



ELECTRICAL DATA

	WP-469-1	WP-469-2	WP-479-1	WP-479-2
Tuning Range	406-420 MHz	406-420 MHz	450-512 MHz	450-512 MHz
Insertion Loss (desired frequency)	Adjustable— 0.5 to 2.0 dB	Adjustable— 1.0 to 6.0 dB	Adjustable— 0.5 to 2.0 dB	Adjustable— 1.0 to 6.0 dB
Attenuation (undesired frequency)	See Fig. 1	See Fig. 2	See Fig. 1	See Fig. 2
Nominal Impedance	50 ohms	50 ohms	50 ohms	50 ohms
VSWR at Resonance (maximum)	1.5 to 1	1.5 to 1	1.5 to 1	1.5 to 1
Maximum power input (continuous duty) with insertion loss per cavity at:				
0.5 dB	350 watts	350 watts	350 watts	350 watts
1.0 dB	250 watts	250 watts	250 watts	250 watts
2.0 dB	150 watts	150 watts	150 watts	150 watts
Temperature Range (for negligible frequency shift)	−30° to +60°C	−30° to +60°C	−30° to +60°C	−30° to +60°C
Cavity Electrical Length	1/4 wavelength	1/4 wavelength	1/4 wavelength	1/4 wavelength

MECHANICAL DATA

Materials:	WP-469-1	WP-469-2	WP-479-1	WP-479-2
Outer Conductor	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Inner Conductor	Silver plated copper	Silver plated copper	Silver plated copper	Silver plated copper
Tuning Rod	Invar	Invar	Invar	Invar
End Plates	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Coupling Loops	Copper	Copper	Copper	Copper
Dimensions:				
Individual Cavity	10″ dia. x 12″	10″ dia. x 12″	10″ dia. x 12″	10″ dia. x 12″
Maximum, outside (with tuning rod extended)	10″ dia. x 17″	11″ x 22″ x 17″	10″ dia. x 17″	11″ x 22″ x 17″
Connector Terminations	Type N female (UHF optional)	Type N female (UHF optional)	Type N female (UHF optional)	Type N female (UHF optional)
Finish	Gray Enamel	Gray Enamel	Gray Enamel	Gray Enamel
Net Weight	7 lbs.	17 lbs.	7 lbs.	17 lbs.
Shipping Weight	10 lbs.	22 lbs.	10 lbs.	22 lbs.

ORDERING INFORMATION

Model WP-469-1 Single cavity tuned to _____ MHz.
Model WP-469-2 Dual cavity tuned to _____ MHz.
Model WP-479-1 Single cavity tuned to _____ MHz.
Model WP-479-2 Dual cavity tuned to _____ MHz.
Model WP-479-3 Triple cavity tuned to _____ MHz.

OPTIONS: If desired, the cavities can be supplied with UHF female connectors. Same price. Specify "with UHF female connectors" after model number.

WACOM PRODUCTS

WACOM PRODUCTS

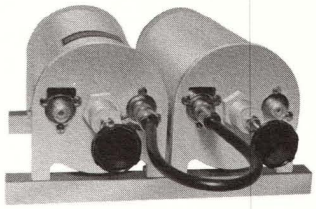
BANDPASS CAVITIES

WP-470

450-512 MHz

ADJUSTABLE SELECTIVITY
POWER: TO 350 WATTS

WP-470-1



WP-470-2

WP-470-3

Model WP-470 is a high Q, ¼ wavelength coaxial cavity filter designed for use with transmitters or receiver in the 450-512 MHz band. The cavity is available in single, dual and triple cavity combinations. The dual and triple cavity models are supplied with interconnecting cables and mounting rails.

APPLICATION: This bandpass cavity is particularly suitable for use with radio systems in large metropolitan areas and/or other frequency congested areas because of the overall protection it provides. The cavity is helpful in reducing or eliminating all types of interference that is frequency rejectionable, i.e., transmitter produced intermodulation interference, receiver produced intermod, transmitter spurious radiations, receiver desensitization. When installed between the antenna and transmitter, the cavity will reduce the spurious output of the transmitter and reduce unwanted "off-frequency" signals from entering the final stages of the transmitter. When installed between the antenna and receiver, the cavity will improve the selectivity of the receiver making it less susceptible to desensitization and/or intermod interference from transmitters in the area. The additional selectivity provided by the cavity is achieved where it is most needed—in the front-end circuits of the receiver.

TUNING: The tuning of the cavity is relatively simple —only basic measuring equipment is required. The cavity can be tuned to any frequency within its operating band by rotating the threaded tuning rod which varies the length of the center coaxial conductor.

ADJUSTABLE SELECTIVITY is provided by the rotatable coupling loops on the front of each cavity. The loops can be turned to positions corresponding to an overall insertion loss of ½ dB, 1 dB or 2 dB for each cavity. An increase in insertion loss will result in increased selectivity response. The rotatable loops provide the means for adjusting the selectivity response to the level required to reduce or eliminate the interference, with minimum insertion loss at the desired frequency.

CONSTRUCTION: To assure top performance and long life, quality materials are used throughout the cavity. End plates and outer conductor are made of chromated aluminum, coupling loops are made of copper, both sections of the center conductor are made of silver plated copper. Galvanic corrosion is minimized by the use of similar materials or by passivating the dissimilar materials in contact. Tough and durable, the cavity will withstand rough handling.

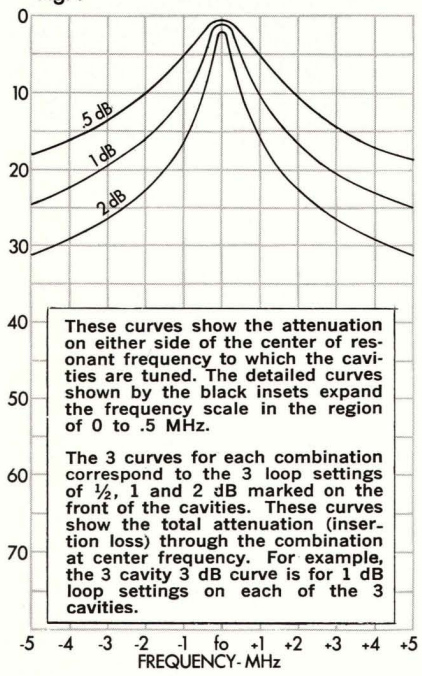
FREQUENCY STABILITY of the cavity is excellent. Since the resonant frequency of the cavity is determined by the length of the cavity center conductor, a threaded rod of "Invar", a metal with nearly zero coefficient of expansion, is used to control the center conductor length. The cavity will remain tuned over an extremely wide temperature range.

INSTALLATION of the cavity is simple and straight forward. It can be mounted in any position near the transmitter or receiver. The cavity is a passive device which requires no maintenance. For outdoor installations. a weatherproof housing should be used.

Printed in USA—2-84

TYPICAL SELECTIVITY CHARACTERISTICS

Fig. 1

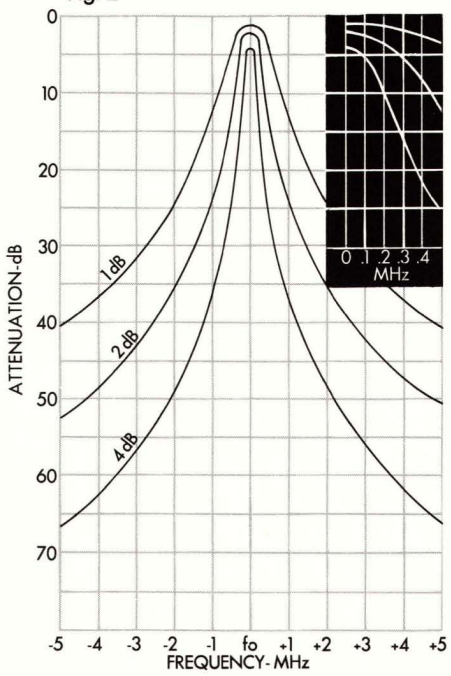


These curves show the attenuation on either side of the center of resonant frequency to which the cavities are tuned. The detailed curves shown by the black insets expand the frequency scale in the region of 0 to .5 MHz.

The 3 curves for each combination correspond to the 3 loop settings of ½, 1 and 2 dB marked on the front of the cavities. These curves show the total attenuation (insertion loss) through the combination at center frequency. For example, the 3 cavity 3 dB curve is for 1 dB loop settings on each of the 3 cavities.

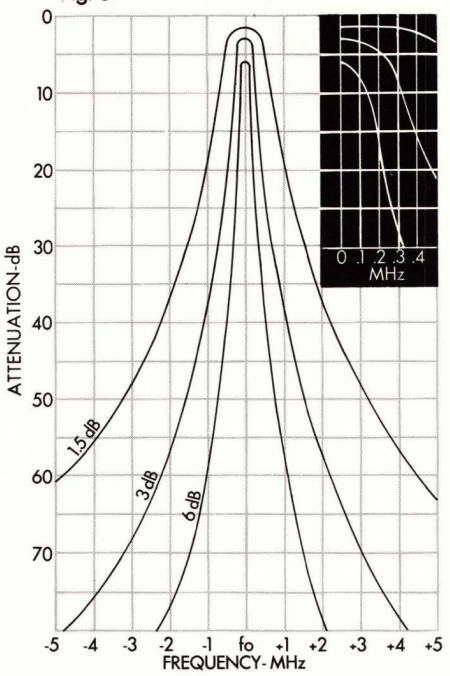
WP-470-1 SINGLE CAVITY

Fig. 2



WP-470-2 DUAL CAVITY

Fig. 3



WP-470-3 TRIPLE CAVITY

ELECTRICAL DATA

	WP-470-1	WP-470-2	WP-470-3
Tuning Range	440-512 MHz	440-512 MHz	440-512 MHz
Insertion Loss (desired frequency)	Adjustable— 0.5 to 2.0 dB	Adjustable— 1.0 to 4.0 dB	Adjustable— 1.5 to 6 dB
Attenuation (undesired frequency)	See Fig. 1	See Fig. 2	See Fig. 3
Nominal Impedance	50 ohms	50 ohms	50 ohms
VSWR at Resonance (maximum)	1.5 to 1	1.5 to 1	1.5 to 1
Maximum power input (continuous duty with insertion loss per cavity at:			
0.5 dB	350 watts	350 watts	350 watts
1.0 dB	250 watts	250 watts	250 watts
2.0 d.b	150 watts	150 watts	150 watts
Temperature Range (for negligible frequency shift)	– 30° to + 60°C	– 30° to + 60°C	– 30° to + 60°C
Cavity Electrical Length	¼ wavelength	¼ wavelength	¼ wavelength

MECHANICAL DATA

	WP-470-1	WP-470-2	WP-470-3
Materials:			
Outer Conductor	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Inner Conductor	Silver plated copper	Silver plated copper	Silver plated copper
Tuning Rod	Invar	Invar	Invar
End Plates	A-380 Aluminum	A-380 Aluminum	A-380 Aluminum
Coupling Loops	Copper	Copper	Copper
Dimensions:			
Individual Cavity	5″ dia. x 9½″	5″ dia. x 9½″	5″ dia. x 9½″
Maximum, outside (with tuning rod extended)	7″ x 6″ x 14″	7″ x 13″ x 14″	7″ x 19″ x 14″
Connector Terminations	Type N female	Type N female	Type N female
Finish	Gray enamel	Gray enamel	Gray enamel
Net Weight	3½ lbs.	8 lbs.	12 lbs.
Shipping Weight	5 lbs.	11 lbs.	15 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-470-1 Single cavity tuned to_____MHz.
Model WP-470-2 Dual cavity tuned to _____MHz.
Model WP-470-3 Triple cavity tuned to _____MHz.

OPTIONS: If desired, the cavities can be supplied with UHF female connectors. Same price. Specify "with UHF female connectors" after model number.

WACOM PRODUCTS

BANDPASS CAVITIES

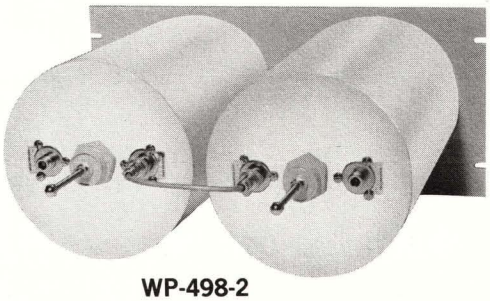
WP-498

800-960 MHz

ADJUSTABLE SELECTIVITY

POWER: TO 350 WATTS

WP-498-1



WP-498-2

WP-498-2

THESE HIGH Q COAXIAL CAVITY FILTERS are high performance models designed for use in systems which require greater selectivity than that provided by smaller diameter filters. The superiority of these high performance models is particularly noticeable when the frequency to be attenuated is relatively close to the frequency to be passed. These bandpass cavities are designed for use between the antenna and the receiver, or between the antenna and the transmitter, to reduce interference which is frequency rejectionable.

MODEL WP-498 is an 8″ OD three-quarter wavelength coaxial cavity filter designed for use with transmitters or receivers operating in the 800-960 MHz band. It is available as a single cavity or as a multiple cavity combination. The multiple cavity models are supplied with interconnect cables and are mounted on panels for 19″ rack mounting.

FREQUENCY STABILITY of the cavity is excellent. Since the resonant frequency of the cavity is determined by the length of the cavity center conductor, a threaded rod of "Invar", a metal with nearly zero coefficient of expansion, is used to control the center conductor length. The cavity will remain tuned over a wide temperature range.

ADJUSTABLE SELECTIVITY is provided by the rotatable coupling loops on the front of each cavity. The loops can be turned to positions corresponding to an overall insertion loss of ½ dB, 1 dB or 2 dB for each cavity. An increase in insertion loss will result in increased selectivity response. The rotatable loops provide the means for adjusting the selectivity response to the level required to reduce or eliminate interference, with minimum insertion loss at the desired frequency.

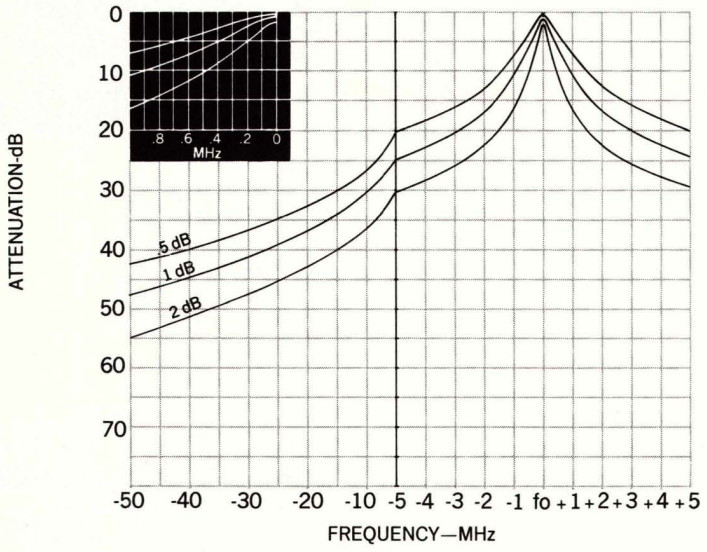
CONSTRUCTION: The end-plates and outer conductor, made of chromated aluminum, are heliarc welded for improved conductivity. Coupling loops are made of copper; both sections of the cavity center conductor are made of silver plated copper. The tuning rod is made of Invar. Quality materials are used throughout the cavity to assure top performance and long life. Galvanic corrosion is minimized by the use of similar materials and by passivating dissimilar materials which are in contact.

TUNING: The tuning of the cavity is relatively simple —only basic measuring equipment is required. The cavity can be tuned to any frequency within its operating band by rotating the threaded tuning rod which varies the length of the center coaxial conductor.

Printed in U.S.A.—6-88

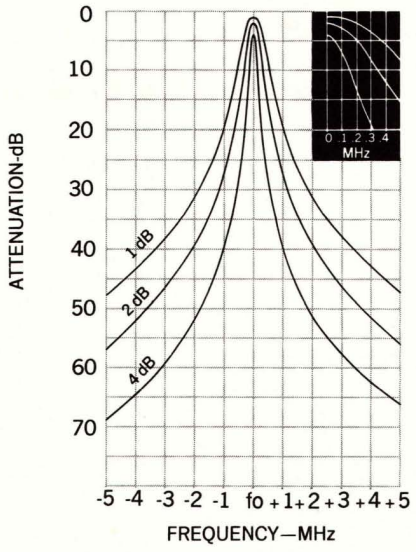
TYPICAL SELECTIVITY CHARACTERISTICS

Fig. 1



WP-498-1 SINGLE CAVITY

Fig. 2



WP-498-2 DUAL CAVITY

ELECTRICAL DATA

	WP-498-1	WP-498-2	WP-498-3
Tuning Range	800-960 MHz	800-960 MHz	800-960 MHz
Insertion Loss (desired frequency)	Adjustable— 0.5 to 2.0 dB	Adjustable— 1.0 to 4.0 dB	Adjustable— 1.5 to 6 dB
Attenuation (undesired frequency)	See Fig. 1	See Fig. 2	Contact Factory
Nominal Impedance	50 ohms	50 ohms	50 ohms
VSWR at Resonance (maximum)	1.5 to 1	1.5 to 1	1.5 to 1
Maximum power input (continuous duty with insertion loss per cavity at:			
0.5 dB	350 watts	350 watts	350 watts
1.0 dB	250 watts	250 watts	250 watts
2.0 dB	150 watts	150 watts	150 watts
Temperature Range (for negligible frequency shift)	– 30° to + 60°C	– 30° to + 60°C	– 30° to + 60°C
Cavity Electrical Length	¾ wavelength	¾ wavelength	¾ wavelength

MECHANICAL DATA

	WP-498-1	WP-498-2	WP-498-3
Materials:			
Outer Conductor	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Inner Conductor	Silver plated copper	Silver plated copper	Silver plated copper
Tuning Rod	Invar	Invar	Invar
End Plates	Aluminum	Aluminum	Aluminum
Coupling Loops	Copper	Copper	Copper
Dimensions:			
Individual Cavity	8″ dia. x 12″	8″ dia. x 12″	8″ dia. x 12″
Maximum, outside (with tuning rod extended)	8″ x 17″	8¾″ x 19″ x 17″	17½″ x 19″ x 17″
Connector Terminations	Type N female	Type N female	Type N female
Finish	Gray enamel	Gray enamel	Gray enamel
Net Weight	6 lbs.	14 lbs.	22 lbs.
Shipping Weight	9 lbs.	19 lbs.	27 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-498-1 Single cavity tuned to_____MHz.
Model WP-498-2 Dual cavity tuned to_____MHz.
Model WP-498-3 Triple cavity tuned to_____MHz.

BpBr Circuit®
BANDPASS-REJECT DUPLEXER

WACOM PRODUCTS

MIN. FREQ. SPACING: 300 KHz POWER: TO 350 WATTS

WP-604

30-50 MHz

U.S. PATENT
No. 4,080,601

THESE BpBr CIRCUIT® DUPLEXERS include the use of an exclusive circuit developed by Wacom Products which provides superior suppression of spurious sideband noise between and adjacent to the duplex frequencies. When used with a high Q cavity, the BpBr Circuit provides frequency response curves with bandpass cavity characteristics at the frequency to be passed and band-reject cavity characteristics at the frequency to be attenuated. Performance characteristics improve as the frequency separation is increased. Frequency stability of the BpBr Circuit duplexer is excellent—an important factor at close frequency spacing. Each model will handle transmitter powers up to 350 watts and all models are supplied with complete cable harness and mounting frame.

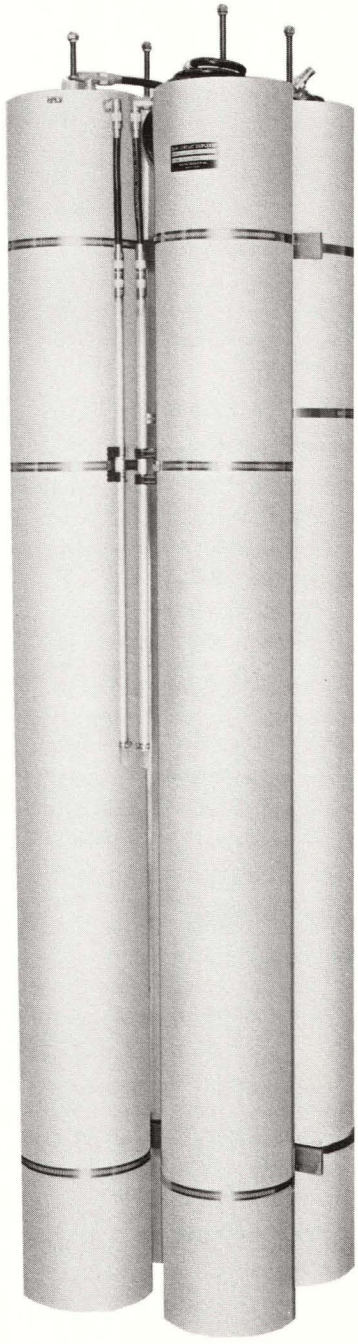
ADVANTAGES OF THE BpBr CIRCUIT®: Assuming a given insertion loss at the pass frequency, the BpBr Circuit filter provides superior bandpass characteristics near the pass frequency and a significantly wider notch at the frequency to be attenuated when compared with other types of bandpass-reject filters. These features result in superior transmitter to receiver isolation, superior protection to and from other nearby radio systems, and a greater stability over a wide temperature range. In addition field tuning of a BpBr Circuit filter is considerably easier than field tuning of most other types of bandpass-reject filters.

MODEL WP-604 is designed for use with duplex stations operating in the 30-50 MHz band when the separation between transmit and receive frequencies is 300 KHz or more. Specifically, Model WP-604-A is designed for use in the 30-35 MHz band; Model WP-604-B for 35-40 MHz; Model WP-604-C for 40-45 MHz and Model WP-604-D for the 45-50 MHz band. The duplexer consists of four 8″ OD cavities interconnected with double shielded coaxial cable in a bandpass-reject configuration. It is generally suitable for use with all types of duplex stations, particularly the latest solid state types which require attenuation of transmitter sideband noise over a wide portion of the spectrum.

CONSTRUCTION: The top end-plate and outer conductor, made of chromated aluminum, are heliarc welded for improved conductivity. Coupling loops are made of copper; both sections of the cavity center conductor are made of silver plated copper. The tuning rod is made of Invar. Quality materials are used throughout the duplexer to assure top performance and long life. Galvanic corrosion is minimized by the use of similar materials and by passivating dissimilar materials which are in contact.

TUNING: The duplexer is factory tuned to the exact transmit and receive frequencies prior to shipment from the factory. No further field adjustment is normally required. If desired, the duplexer can be field tuned to new frequencies within its operating band by rotating the threaded tuning rod ("pass" frequency alignment) and adjusting the length of the adjustable stub ("reject" frequency alignment) of each filter.

INSTALLATION: The duplexer can be mounted in any position but is normally mounted vertically, with the tuning rods up. Double-shielded coaxial cable (such as RG-214 or RG-142) must be used to interconnect the duplexer to the transmitter and receiver chassis if maximum isolation is to be maintained. A suitable duplexer installation cable kit (Part No. 30090) is available as an optional item.



Model WP-604-C

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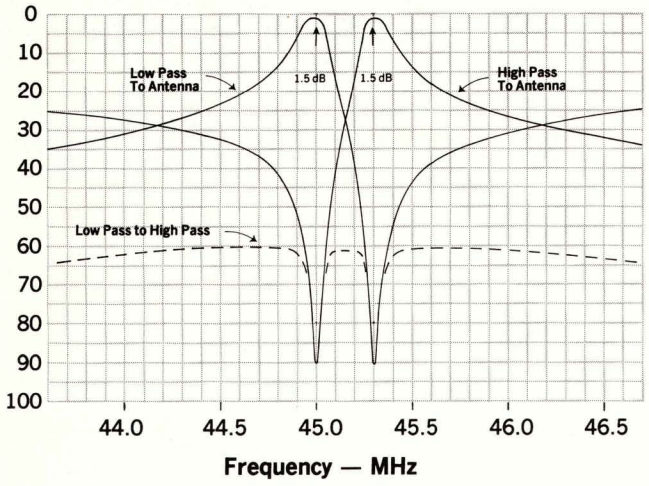
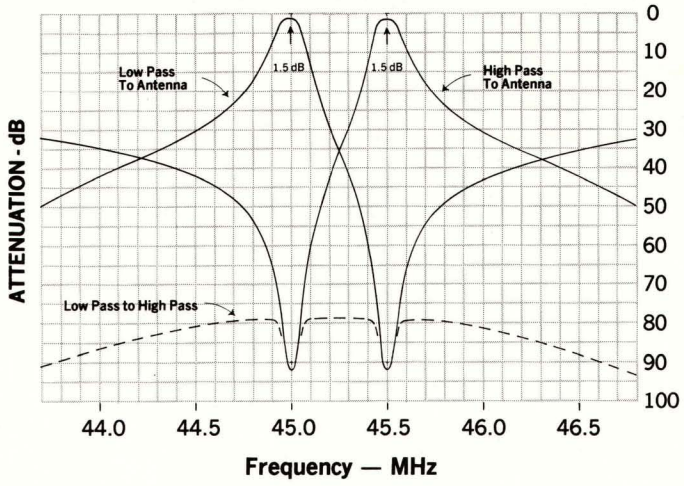
Printed in USA—6-85

TYPICAL DUPLEX RESPONSE CURVES

WP-604 @ 300 KHz Separation



WP-604 @ 500 KHz Separation



ELECTRICAL DATA

	Model WP-604-A	Model WP-604-B	Model WP-604-C	Model WP-604-D
Tuning Range	30-35 MHz	35-40 MHz	40-45 MHz	45-50 MHz
Minimum Frequency Separation	0.3 MHz or more	0.3 MHz or more	0.3 MHz or more	0.3 MHz or more
Maximum Power Input (continuous duty)	350 watts	350 watts	350 watts	350 watts
Insertion Loss: (Tx and Rx to Antenna)				
at 0.3 MHz separation	1.5 dB	1.5 dB	1.5 dB	1.5 dB
at 0.5 MHz separation	1.5 dB	1.5 dB	1.5 dB	1.5 dB
Attenuation at Tx Frequency:				
at 0.3 MHz separation	85 dB	85 dB	85 dB	85 dB
at 0.5 MHz or more separation	90 dB	90 dB	90 dB	90 dB
Attenuation at Rx Frequency:				
at 0.3 MHz separation	85 dB	85 dB	85 dB	85 dB
at 0.5 MHz or more separation	90 dB	90 dB	90 dB	90 dB
Isolation (midway between channels)				
with 0.3 MHz separation	60 dB	60 dB	60 dB	60 dB
with 0.5 MHz or more separation	75 dB	75 dB	75 dB	75 dB
Maximum VSWR (Ref. 50 ohms)	1.3 to 1	1.3 to 1	1.3 to 1	1.3 to 1
Temperature Range	– 30° to + 60° C	– 30° to + 60° C	– 30° to + 60° C	– 30° to + 60° C
Number of Cavity Filters	4	4	4	4

MECHANICAL DATA

	Model WP-604-A	Model WP-604-B	Model WP-604-C	Model WP-604-D
Dimensions:				
Individual Cavity (not incl. tuning rod)	8″ OD x 80″	8″ OD x 80″	8″ OD x 80″	8″ OD x 72″
Duplexer (D x W x H) with tuning rods fully extended	17″ x 19″ x 91″	17″ x 19″ x 91″	17″ x 19″ x 91″	17″ x 19″ x 82″
Connector Terminations (Tx, Rx, Ant.)	UHF Female (Type N Optional)	UHF Female (Type N Optional)	UHF Female (Type N Optional)	UHF Female (Type N Optional)
Finish	Gray Enamel	Gray Enamel	Gray Enamel	Gray Enamel
Net Weight	112 lbs.	110 lbs.	105 lbs.	98 lbs.
Shipping Weight	124 lbs.	122 lbs.	117 lbs.	110 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-604-A Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-604-B Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-604-C Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-604-D Duplexer with Tx on_____MHz and Rx on_____MHz

When ordering specify exact Tx and Rx frequency

WACOM PRODUCTS

BpBr Circuit®
BANDPASS-REJECT DUPLEXER

MIN. FREQ. SPACING: 500 KHz POWER: TO 350 WATTS

WP-612

66-88 MHz

THESE BpBr CIRCUIT® DUPLEXERS include the use of an exclusive circuit developed by Wacom Products which provides superior suppression of spurious sideband noise between and adjacent to the duplex frequencies. When used with a high Q cavity, the BpBr Circuit provides frequency response curves with bandpass cavity characteristics at the frequency to be passed and band-reject cavity characteristics at the frequency to be attenuated. Performance characteristics improve as the frequency separation is increased. Frequency stability of the BpBr Circuit duplexer is excellent—an important factor at close frequency spacing. Each model will handle transmitter powers up to 350 watts and all models are supplied with complete cable harness and mounting frame.

ADVANTAGES OF THE BpBr CIRCUIT®. Assuming a given insertion loss at the pass frequency, comparison of the performance of the BpBr Circuit filter versus other types of bandpass-reject filters will reveal the BpBr Circuit filter provides superior bandpass characteristics near the pass frequency and a significantly wider notch at the frequencies to be attenuated. These features result in superior transmitter to receiver isolation, superior protection to and from other nearby radio systems, and greater stability over a wide temperature range. In addition field tuning of a BpBr Circuit filter is considerably easier than field tuning of most other types of bandpass-reject filters.

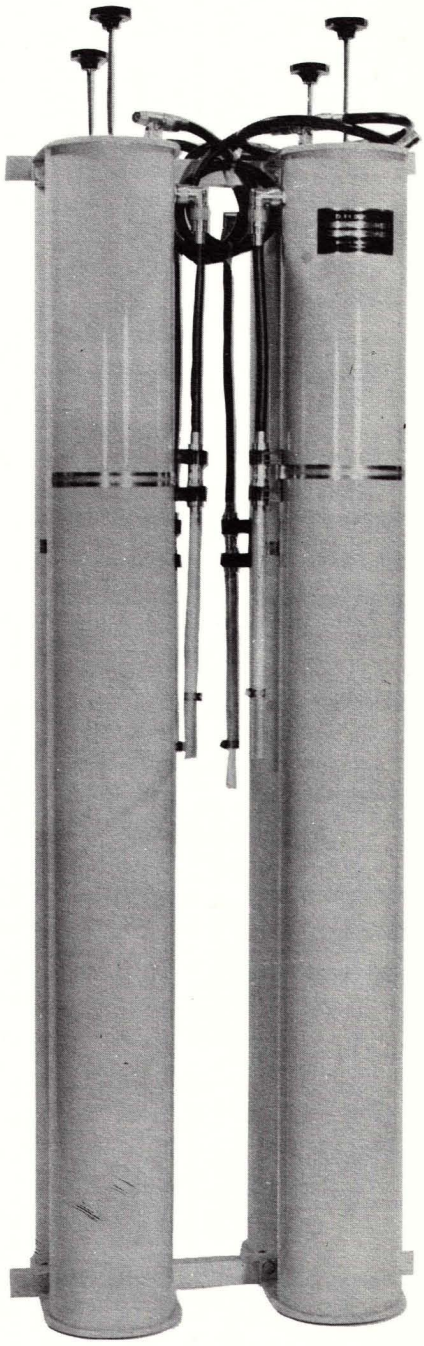
Model WP-612 is designed for use with duplex stations operating in the 66-88 MHz band when the separation between transmit and receive frequencies is 500 KHz or more. Three models, each with a tuning range of 10 MHz, cover the 66-88 MHz band. The duplexer consists of four 5″ OD cavities interconnected with double shielded coaxial cable in a bandpass-reject configuration. It is generally suitable for use with all types of duplex stations, particularly the latest solid state types which require attenuation of transmitter sideband noise over a wide portion of the spectrum.

CONSTRUCTION: To assure top performance and long life, quality materials are used throughout the cavities. End-plates and outer conductor are made of chromated aluminum; coupling loops are made of copper; both sections of the center conductor are made of silver plated copper. For improved frequency stability over a wide temperature range, a threaded rod of "INVAR" (a metal with nearly zero coefficient of expansion) is used to control the length of the center conductor. Galvanic corrosion is minimized by the use of similar materials and by passivating dissimilar materials which are in contact.

TUNING: The duplexer is factory tuned to the exact transmit and receive frequencies prior to shipment from the factory. No further field adjustment is normally required. If desired, the duplexer can be field tuned to new frequencies within its operating band by rotating the threaded tuning rod ("pass" frequency alignment) and adjusting the length of the adjustable stub ("reject" frequency alignment) of each filter.

INSTALLATION: The duplexer can be mounted in any position but is normally mounted vertically, with the tuning rods up. Double-shielded coaxial cable (such as RG-214 or RG-142) must be used to interconnect the duplexer to the transmitter and receiver chassis if maximum isolation is to be maintained. A suitable duplexer installation cable kit (Part No. 30090) is available as an optional item.

U.S. PATENT No. 4,080,601



Model WP-612

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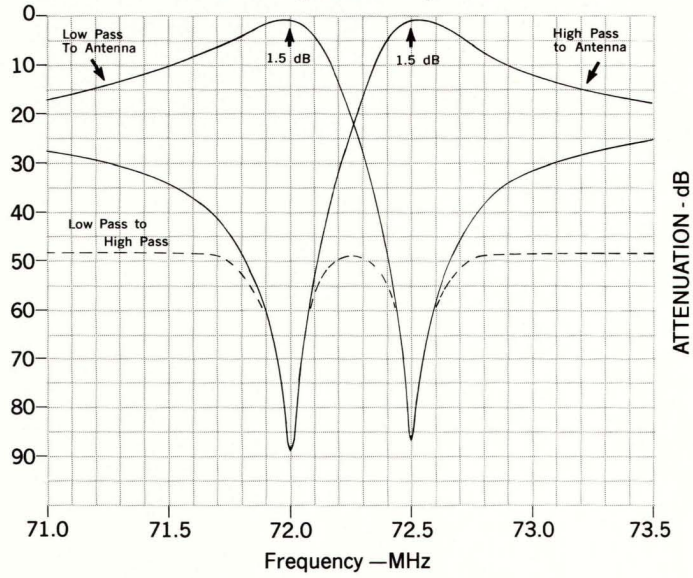
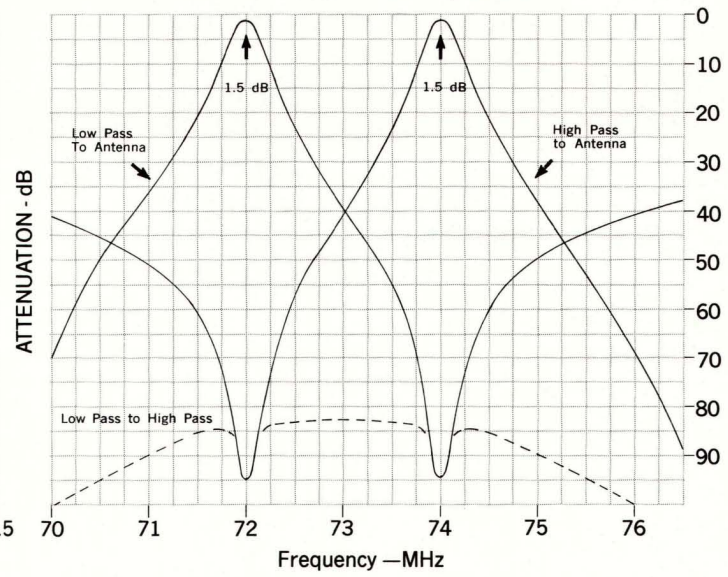
Printed in USA—5-83

TYPICAL DUPLEX RESPONSE CURVES

WP-612 @ 0.5 MHz Separation



WP-612 @ 2.0 MHz Separation



ELECTRICAL DATA

	Model WP-612-A	Model WP-612-B	Model WP-612-C
Tuning Range	66-76 MHz	70-80 MHz	78-88 MHz
Minimum Frequency Separation	0.5 MHz or more	0.5 MHz or more	0.5 MHz or more
Maximum Power Input (continuous duty)	350 watts	350 watts	350 watts
Insertion Loss (Tx and Rx to antenna)			
with 0.5 MHz separation	1.5 dB	1.5 dB	1.5 dB
with 2.0 MHz Separation	1.5 dB	1.5 dB	1.5 dB
Isolation at Tx Freq. and Rx Freq.			
with 0.5 MHz separation	85 dB	85 dB	85 dB
with 2.0 MHz or more separation	90 dB	90 dB	90 dB
Isolation (midway between channels)			
with 0.5 MHz separation	45 dB	45 dB	45 dB
with 2.0 MHz or more separation	80 dB	80 dB	80 dB
Maximum VSWR (Ref. 50 ohms)	1.3 to 1	1.3 to 1	1.3 to 1
Temperature Range	– 30° to + 60°C	– 30° to + 60°C	– 30° to + 60°C
Number of Cavity Filters	4	4	4

MECHANICAL DATA

	Model WP-612-A	Model WP-612-B	Model WP-612-C
Dimensions:			
Individual Cavity (not incl. tuning rod)	5″ OD x 48″	5″ OD x 45″	5″ OD x 42″
Duplexer (D x W x H) with tuning rods fully extended	13″ x 17″ x 58″	13″ x 17″ x 55″	13″ x 17″ x 52″
Connector Terminations (Tx, Rx, Ant)	UHF Female (Type N optional)	UHF Female (Type N optional)	UHF Female (Type N optional)
Finish	Gray enamel	Gray enamel	Gray enamel
Net Weight	45 lbs.	43 lbs.	41 lbs.
Shipping Weight	62 lbs.	60 lbs.	58 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-612-A Duplexer with TX on _____ MHz and RX on _____ MHz
Model WP-612-B Duplexer with TX on _____ MHz and RX on _____ MHz
Model WP-612-C Duplexer with TX on _____ MHz and RX on _____ MHz

When ordering specify exact TX and RX frequency.

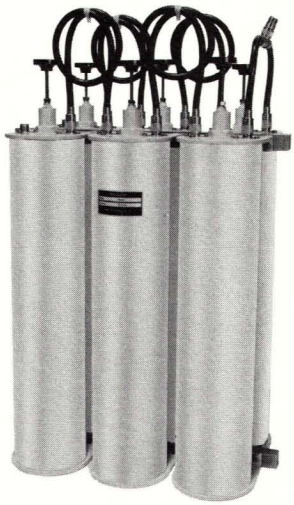
BANDPASS DUPLEXERS

WACOM PRODUCTS MIN. FREQ. SPACING: 3 MHz POWER: TO 350 WATTS

WP-633
WP-634
WP-636
144-174 MHz

WP-633

WP-634



WP-636

THESE BANDPASS TYPE DUPLEXERS are particularly suited for use with 144-174 MHz duplex stations in frequency congested areas because of the overall protection they provide. The bandpass duplexer not only isolates the receiver from its associated transmitter but provides substantial protection to the receiver from other transmitters in the area. Similarly, transmitter noise radiation is not only reduced at the associated receiver frequency but is reduced at all other frequencies as well. These models are extremely stable and will provide rated performance over a wide temperature range while handling transmitter powers up to 350 watts. Each model is supplied with interconnect cable harness and mounting rails.

MODEL WP-633 includes two bandpass cavities in the transmitter section and one bandpass cavity in the receiver section interconnected in a bandpass duplexer configuration. The duplexer is designed primarily for use with the newer solid-state type stations (with highly selective receivers) when the frequency spacing between transmitter and receiver is 5 MHz or more.

MODEL WP-634 consists of two bandpass cavities in the transmitter section and two bandpass cavities in the receiver section interconnected in a bandpass duplexer configuration. The duplexer is designed for use with the newer solid-state type stations when the frequency separation between transmitter and receiver is 4 MHz or more. It is also suitable for use with the older partially transistorized stations at this spacing.

MODEL WP-636 consists of three bandpass cavities in the transmitter section and three bandpass cavities in the receiver section interconnected in a bandpass duplexer configuration. It has been designed for use with the newer solid-state type stations when the transmit and receive frequencies are separated by 3 MHz or more. It is also suitable for use with the older partially transistorized stations at this spacing.

ADJUSTABLE SELECTIVITY is provided by the rotatable coupling loops on the front of each cavity. The amount of Tx to Rx isolation provided by the duplexer is determined by the setting of the coupling loops. When the insertion loss is adjusted to the values indicated in the specifications, typically the duplexer will provide the response characteristics illustrated by the curves. Improved selectivity and even greater isolation can be obtained, if desired, by turning the coupling loops to a higher insertion loss setting.

TUNING: The tuning of the duplexer is relatively simple—only basic measuring equipment is required. The duplexer can be tuned to any two frequencies within the 144-174 MHz band by turning the threaded rod of each cavity which varies the length of the center coaxial conductor.

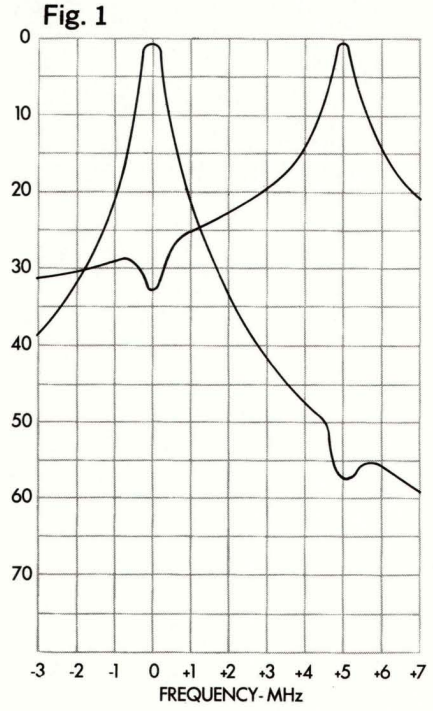
FREQUENCY STABILITY of the duplexer is excellent. Since the resonant frequency of each cavity is determined by the length of the cavity center conductor, a threaded rod of "Invar", a metal with nearly zero coefficient of expansion, is used to control the center conductor length.

INSTALLATION of the duplexer is simple and straight forward. It can be mounted in any position near the station. The duplexer is a passive device which requires no maintenance. An indoor cabinet is available as an optional item.

Printed in USA—9-85

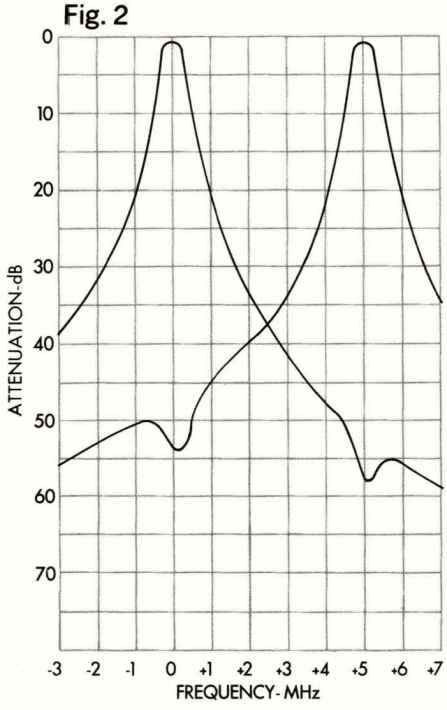
TYPICAL DUPLEX RESPONSE CURVES

Fig. 1



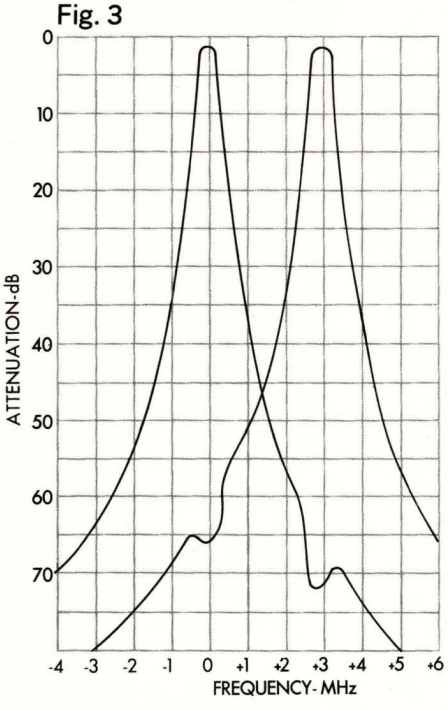
Model WP-633

Fig. 2



Model WP-634

Fig. 3



Model WP-636

ELECTRICAL DATA

	Model WP-633	Model WP-634	Model WP-636
Tuning Range	144-174 MHz	144-174 MHz	144-174 MHz
Minimum Frequency Separation	5 MHz or more	4 MHz or more	3 MHz or more
Maximum Power Input (continuous duty) with ½ dB loop settings, each cavity	350 watts	350 watts	350 watts
Insertion Loss:			
Transmitter to antenna	1.0 dB	1.3 dB	1.7 dB
Receiver to antenna	1.3 dB	1.3 dB	1.7 dB
Isolation (Tx to Rx):			
at Tx frequency	33 dB @ 5 MHz	50 dB @ 4 MHz 60 dB @ 5 MHz	62 dB @ 3 MHz 80 dB @ 5 MHz
at Rx frequency	60 dB @ 5 MHz	50 dB @ 4 MHz 60 dB @ 5 MHz	62 dB @ 3 MHz 80 dB @ 5 MHz
Maximum VSWR (Ref. 50 ohms)	1.5 to 1	1.5 to 1	1.5 to 1
Temperature Range	– 30°C to + 60°C	– 30°C to + 60°C	– 30°C to + 60°C
Number of Cavity Filters	3	4	6

MECHANICAL DATA

	Model WP-633	Model WP-634	Model WP-636
Duplexer Dimensions (D x W x H) with tuning rods fully extended	7″ x 13″ x 29″	7″ x 25″ x 29″	13″ x 19″ x 29″
Connector Terminations (Tx, Rx, Ant)	UHF female	UHF female	UHF female
Finish	Gray enamel	Gray enamel	Gray enamel
Net Weight	22 lbs.	29 lbs.	38 lbs.
Shipping Weight	27 lbs.	35 lbs.	60 lbs.
Optional Cabinet	WP-204	WP-204	WP-204
Dimensions, cabinet (D x W x H)	18½″ x 22½″ x 41″	18½″ x 22½″ x 41″	18½″ x 22½″ x 41″
Net Weight (cabinet only)	93 lbs.	93 lbs.	93 lbs.
Shipping Weight (cabinet only)	98 lbs.	98 lbs.	98 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-633 Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-634 Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-636 Duplexer with Tx on_____MHz and Rx on_____MHz

When ordering specify exact Tx and Rx frequency.

WACOM PRODUCTS

BpBr Circuit®
BANDPASS-REJECT DUPLEXERS

MIN. FREQ. SPACING: 600 KHz POWER: TO 350 WATTS

WP-639
144-174 MHz

WP-629
118-144 MHz

U.S. PATENT
No. 4,080,601

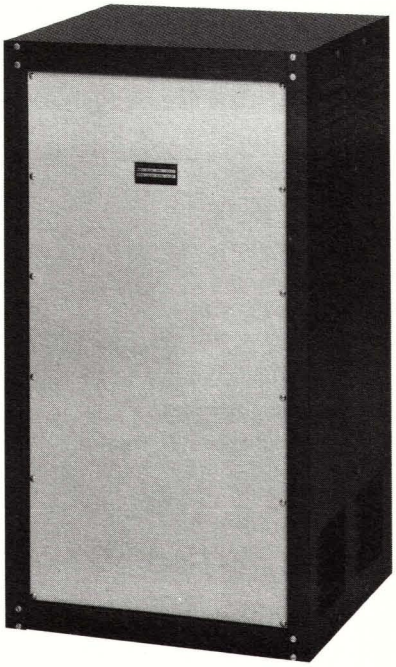
THESE BpBr CIRCUIT® DUPLEXERS include the use of an exclusive circuit developed by Wacom Products which provides superior suppression of spurious sideband noise between and adjacent to the duplex frequencies. When used with a high Q cavity, the BpBr Circuit provides frequency response curves with bandpass cavity characteristics at the frequency to be passed and band-reject cavity characteristics at the frequency to be attenuated. Performance characteristics improve as the frequency separation is increased. Frequency stability of the BpBr Circuit duplexer is excellent—an important factor at close frequency spacing. Each model will handle transmitter powers up to 350 watts and all models are supplied with complete cable harness and mounting frame.

ADVANTAGES OF THE BpBr CIRCUIT®: Assuming a given insertion loss at the pass frequency, comparison of the performance of the BpBr Circuit filter versus other types of bandpass-reject filters will reveal the BpBr Circuit filter provides superior bandpass characteristics near the pass frequency and a significantly wider notch at the frequencies to be attenuated. These features result in superior transmitter to receiver isolation, superior protecton to and from other nearby radio systems, and greater stability over a wide temperature range. In addition field tuning of a BpBr Circuit filter is considerably easier than field tuning of most other types of bandpass-reject filters.

Model WP-639

MODEL WP-639 is designed for use with duplex stations operating in the 144-174 MHz band when the separation between transmit and receive frequencies is 600 KHz or more. It consists of four 5″ OD cavities interconnected with double shielded coaxial cable in a bandpass-reject configuration. It is generally suitable for use with all types of duplex stations, particularly the latest solid state types which require attenuation of transmitter sideband noise over a wide portion of the spectrum. Model WP-204 cabinet is available as an optional item.

MODEL WP-629 is identical to the above model but designed for use with duplex stations operating in the 118-136 MHz band (A Range) or 130-144 MHz band (B Range) when the transmit and receive frequencies are separated by 600 KHz or more.



Optional Model WP-204
Indoor Cabinet

CONSTRUCTION: The end-plates and outer conductor are made of chromated aluminum. Coupling loops are made of copper; both sections of the cavity center conductor are made of silver plated copper. The tuning rod is made of Invar. Quality materials are used throughout the duplexer to assure top performance and long life. Galvanic corrosion is minimized by the use of similar materials and by passivating dissimilar materials which are in contact.

TUNING: The duplexer is factory tuned to the exact transmit and receive frequencies prior to shipment from the factory. No further field adjustment is normally required. If desired, the duplexer can be field tuned to new frequencies within its operating band by rotating the threaded tuning rod ("pass" frequency alignment) and adjusting the length of the adjustable stub ("reject" frequency alignment) of each filter.

INSTALLATION: The duplexer can be mounted in any position but is normally mounted vertically, with the tuning rods up. Double-shielded coaxial cable (such as RG-214 or RG-142) must be used to interconnect the duplexer to the transmitter and receiver chassis if maximum isolation is to be maintained. A suitable duplexer installation cable kit (Part No. 30090) is available as an optional item.

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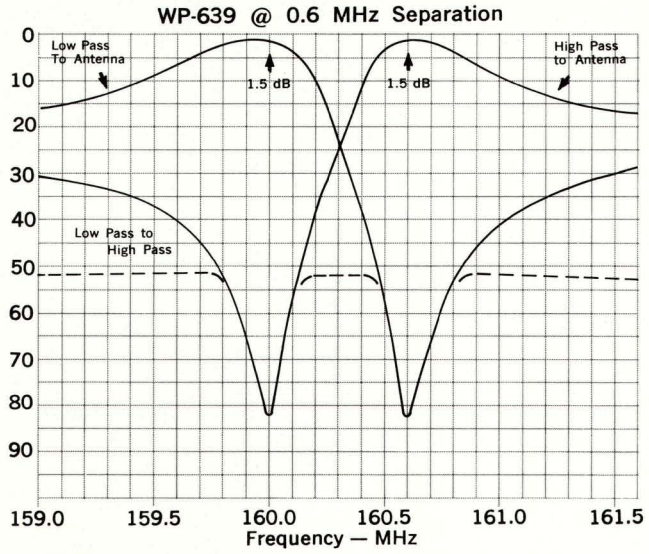
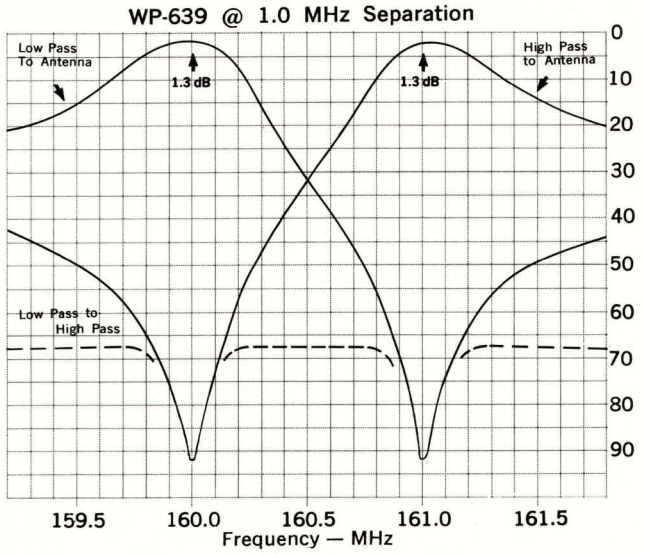
Printed in USA—3-87

TYPICAL DUPLEX RESPONSE CURVES



MODEL WP-639



MODEL WP-639

ELECTRICAL DATA

	Model WP-629	Model WP-639
Tuning Range A Range	118-136 MHz	144-174 MHz
B Range	130-144 MHz	
Minimum Frequency Separation	0.6 MHz or more	0.6 MHz or more
Maximum Power Input (continuous duty)	350 watts	350 watts
Insertion Loss (Tx and Rx to antenna)		
at 0.6 MHz separation	1.5 dB	1.5 dB
at 1.0 MHz separation	1.3 dB	1.3 dB
Attenuation at Tx Freq. and Rx Freq.		
at 0.6 MHz separation	80 dB	80 dB
at 1.0 Mhz or more separation	90 dB	90 dB
Isolation (midway between channels)		
with .06 MHz separation	50 dB	50 dB
with 1.0 MHz or more separation	65 dB	65 dB
Maximum VSWR (Ref. 50 ohms)	1.3 to 1	1.3 to 1
Temperature Range	– 30° to + 60°C	– 30° to + 60°C
Number of Cavity Filters	4	4

MECHANICAL DATA

	Model WP-629	Model WP-639
Dimensions:		
Individual Cavity (not incl. tuning rod)	5″ OD x 27″	5″ OD x 23″
Duplexer (D x W x H) with tuning rods fully extended	13″ x 17″ x 36″	13″ x 17″ x 29″
Connector Terminations (Tx, Rx, Ant.)	UHF Female (Type N Optional)	UHF Female (Type N Optional)
Finish	Gray enamel	Gray enamel
Net Weight	32 lbs.	28 lbs.
Shipping Weight	37 lbs.	33 lbs.
Optional Cabinet	WP-204	WP-204
Dimensions, cabinet, (D x W x H)	18½″ x 22½″ x 41″	18½″ x 22½″ x 41″
Shipping Weight (Cabinet & Duplexer)	130 lbs.	130 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-629 Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-639 Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-204 Optional Cabinet

When ordering specify exact Tx and Rx frequency

WACOM PRODUCTS

COMPACT BpBr Circuit® BANDPASS-REJECT DUPLEXERS

MIN. FREQ. SPACING: 700 KHz POWER: TO 350 WATTS

WP-640-5
WP-640-6

160-174-MHz

U.S.PATENT
No. 4,080,601

THESE BpBr CIRCUIT® DUPLEXERS include the use of an exclusive circuit developed by Wacom Products which provides superior suppression of spurious sideband noise between and adjacent to the duplex frequencies. When used with a high Q cavity, the BpBr Circuit provides frequency response curves with bandpass cavity characteristics at the frequency to be passed and band-reject cavity characteristics at the frequency to be attenuated. Performance characteristics improve as the frequency separation is increased. Frequency stability of the BpBr Circuit duplexer is excellent—an important factor at close frequency spacing. Each model will handle transmitter powers up to 350 watts and all models are supplied with complete cable harness and mounting frame.

ADVANTAGES OF THE BpBr CIRCUIT®: Assuming a given insertion loss at the pass frequency, comparison of the performance of the BpBr Circuit filter versus other types of Bandpass-reject filters will reveal the BpBr Circuit filter provides superior bandpass characteristics near the pass frequency and a significantly wider notch at the frequencies to be attenuated. These features result in superior transmitter to receiver isolation, superior protection to and from other nearby radio systems, and greater stability over a wide temperature range. In addition field tuning of a BpBr Circuit filter is considerably easier than field tuning of most other types of bandpass-reject filters.

MODEL WP-640-5 is designed for use with duplex stations operating in the 160-174 MHz band when the separation between transmit and receive frequencies is 700 KHz or more. It consists of five 5″ OD cavities interconnected with double-shielded coaxial cable in a duplexer configuration. Two bandpass-reject cavities are used in transmitter section and two bandpass-reject cavities plus a bandpass cavity are used in the receiver section. The extra bandpass cavity in the receiver section provides an additional margin of protection to the receiver from front-end overload and from intermodulation interference problems. Space exists for mounting a sixth cavity in the duplexer package without increasing the overall dimensions. The sixth cavity can be either bandpass or bandpass-reject, and it can be added to either the transmitter or receiver section of the duplexer, depending upon need. Model WP-204 cabinet is available as an optional item.

MODEL WP-640-5

MODEL WP-640-6 is a six-cavity version of the above duplexer. It consists of two bandpass-reject cavities and one bandpass cavity in both sections of the duplexer. The extra bandpass cavity in the transmitter section provides additional attenuation of transmitter sideband noise and offers further protection from generation of transmitter-produced intermodulation interference.

CONSTRUCTION: The end-plates and outer conductor are made of chromated aluminum. Coupling loops are made of copper; both sections of the cavity center conductor are made of silver plated copper. The tuning rod is made of Invar. Quality materials are used throughout the duplexer to assure top performance and long life. Galvanic corrosion is minimized by the use of similar materials and by passivating dissimilar materials which are in contact.

TUNING: The duplexer is factory tuned to the exact transmit and receive frequencies prior to shipment from the factory. No further field adjustment is normally required. If desired, the duplexer can be field tuned to new frequencies within its operating band by rotating the threaded tuning rod ("pass" frequency alignment) and adjusting the capacitor ("reject" frequency alignment) of each filter.

INSTALLATION: The duplexer can be mounted in any position but is normally mounted vertically, with the tuning rods up. Double-shielded coaxial cable (such as RG-214 or RG-142) must be used to interconnect the duplexer to the transmitter and receiver chassis if maximum isolation is to be maintained. A suitable duplexer installation cable kit (Part No. 30091) is available as an optional item.

MODEL WP-640-6

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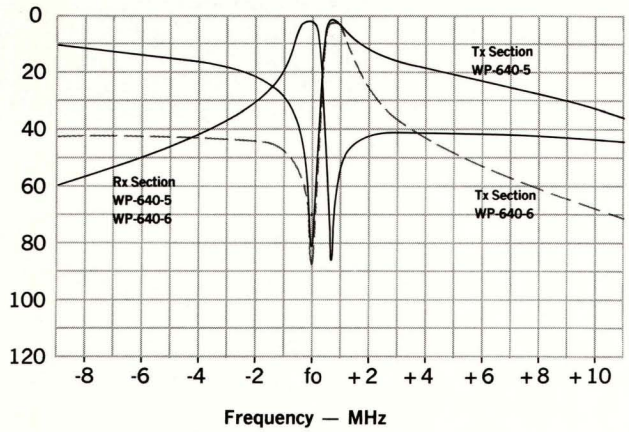
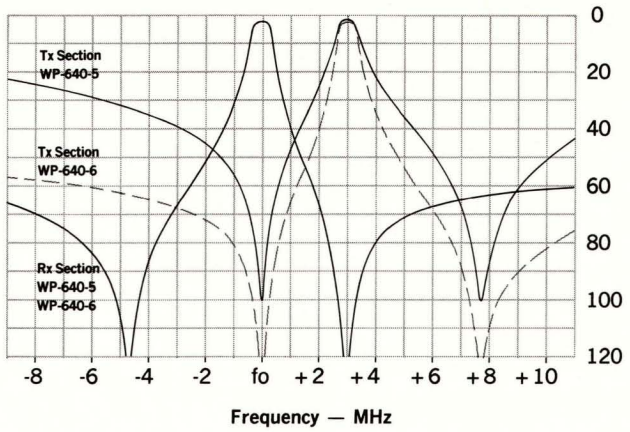
Printed in USA—6-85

TYPICAL DUPLEX RESPONSE CURVES

WP-640-5 and WP-640-6@ 0.7 MHz Separation



WP-640-5 and WP-640-6 @ 3.0 MHz Separation



ELECTRICAL DATA

	Model WP-640-5	Model WP-640-6
Tuning Range	160-174 MHz	160-174 MHz
Minimum Frequency Separation	0.7 MHz or more	0.7 MHz or more
Maximum Power Input (continuous duty)	350 watts	350 watts
Insertion Loss:		
Transmitter to antenna	1.5 dB	2.0 dB
Receiver to antenna	2.0 dB	2.0 dB
Isolation (Tx to Rx):		
at Tx frequency	90 dB @ 0.7 MHz Δ f 120 dB @ 3.0 MHz Δ f	90 dB @ 0.7 MHz Δ f 120 dB @ 3.0 MHz Δ f
at Rx frequency	80 dB @ 0.7 MHz Δ f 100 dB @ 3.0 MHz Δ f	90 dB @ 0.7 MHz Δ f 120 dB @ 3.0 MHz Δ f
Isolation (midway between channels)		
with 0.7 MHz separation	50 dB	55 dB
with 3.0 MHz or more separation	94 dB	120 db
Maximum VSWR (Ref. 50 ohms)	1.3 to 1	1.3 to 1
Temperature Range	-30° to + 60°C	-30° to + 60° C
Number of Cavity Filters	5	6

MECHANICAL DATA

	Model WP-640-5	Model WP-640-6
Dimensions:		
Individual Cavity (not incl. tuning rod)	5″ OD x 16″	5″ OD x 16″
Duplexer (D x W x H) with tuning rods fully extended	13″ x 19″ x 20″	13″ x 19″ x 20″
Connector Terminations (Tx, Rx, Ant.)	Type N Female	Type N Female
Finish	Gray enamel	Gray enamel
Net Weight	26 lbs.	30 lbs.
Shipping Weight	33 lbs.	37 lbs.
Optional Cabinet	WP-204	WP-204
Dimensions, cabinet, (D x W x H)	18½″ x 22½″ x 41″	18½″ x 22½″ x 41″
Shipping Weight (Cabinet & Duplexer)	124 lbs.	128 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-640-5 Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-640-6 Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-204 Optional Cabinet

When ordering specify exact Tx and Rx frequency

WACOM PRODUCTS

BpBr Circuit®
BANDPASS-REJECT DUPLEXERS

MIN. FREQ. SPACING: 500 KHz POWER: TO 350 WATTS

WP-641
144-174 MHz
WP-621
118-144 MHz

THESE BpBr CIRCUIT® DUPLEXERS include the use of an exclusive circuit developed by Wacom Products which provides superior suppression of spurious sideband noise between and adjacent to the duplex frequencies. When used with a high Q cavity, the BpBr Circuit provides frequency response curves with bandpass cavity characteristics at the frequency to be passed and band-reject cavity characteristics at the frequency to be attenuated. Performance characteristics improve as the frequency separation is increased. Frequency stability of the BpBr Circuit duplexer is excellent—an important factor at close frequency spacing. Each model will handle transmitter powers up to 350 watts and all models are supplied with complete cable harness and mounting frame.

ADVANTAGES OF THE BpBr CIRCUIT®: Assuming a given insertion loss at the pass frequency, comparison of the performance of the BpBr Circuit filter versus other types of bandpass-reject filters will reveal the BpBr Circuit filter provides superior bandpass characteristics near the pass frequency and a significantly wider notch at the frequencies to be attenuated. These features result in superior transmitter to receiver isolation, superior protection to and from other nearby radio systems, and greater stability over a wide temperature range. In addition field tuning of a BpBr Circuit filter is considerably easier than field tuning of most other types of bandpass-reject filters.

MODEL WP-641 is designed for use with duplex stations operating in the 144-174 MHz band when the separation between transmit and receive frequencies is 500 KHz or more. It consists of four 8" OD cavities interconnected with double shielded coaxial cable in a bandpass-reject configuration. It is generally suitable for use with all types of duplex stations, particularly the latest solid state types which require attenuation of transmitter sideband noise over a wide portion of the spectrum. Model WP-205 cabinet is available as an optional item.

MODEL WP-621 is identical to the above model but designed for use with duplex stations operating in the 118-144 MHz band when the Tx and Rx frequency separation is 500 KHz or more.

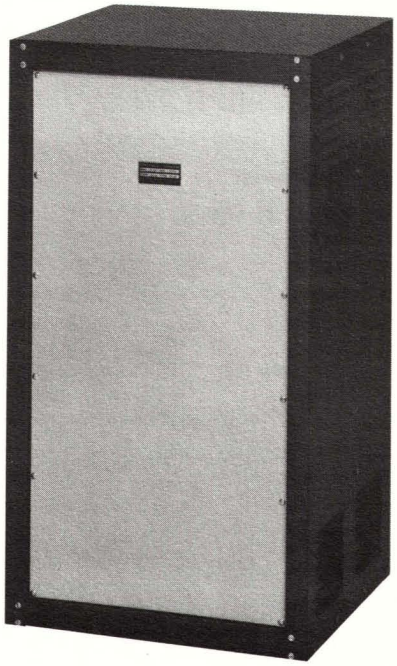
CONSTRUCTION: The top end-plate and outer conductor, made of chromated aluminum, are heliarc welded for improved conductivity. Coupling loops are made of copper; both sections of the cavity center conductor are made of silver plated copper. The tuning rod is made of Invar. Quality materials are used throughout the duplexer to assure top performance and long life. Galvanic corrosion is minimized by the use of similar materials and by passivating dissimilar materials which are in contact.

TUNING: The duplexer is factory tuned to the exact transmit and receive frequencies prior to shipment from the factory. No further field adjustment is normally required. If desired, the duplexer can be field tuned to new frequencies within its operating band by rotating the threaded tuning rod ("pass" frequency alignment) and adjusting the length of the adjustable stub ("reject" frequency alignment) of each filter.

INSTALLATION: The duplexer can be mounted in any position but is normally mounted vertically, with the tuning rods up. Double-shielded coaxial cable (such as RG-214 or RG-142) must be used to interconnect the duplexer to the transmitter and receiver chassis if maximum isolation is to be maintained. A suitable duplexer installation cable kit (Part No. 30090) is available as an optional item.

U. S. PATENT
No. 4,080,601

Model WP-641



Optional Model WP-205
Indoor Cabinet

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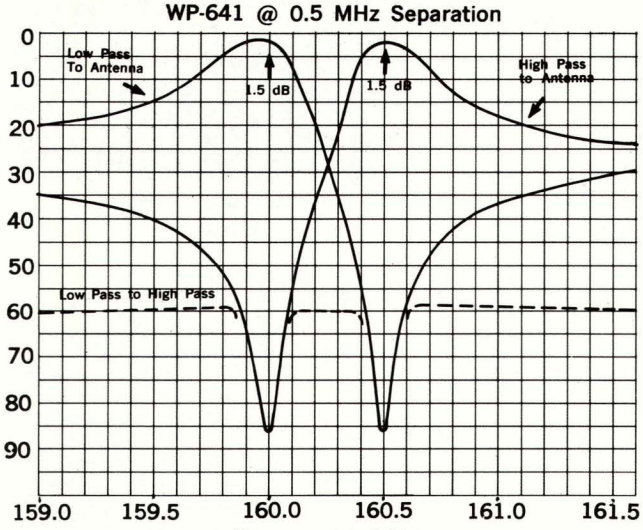
Printed in U.S.A.—1-89

WACOM PRODUCTS, INC.

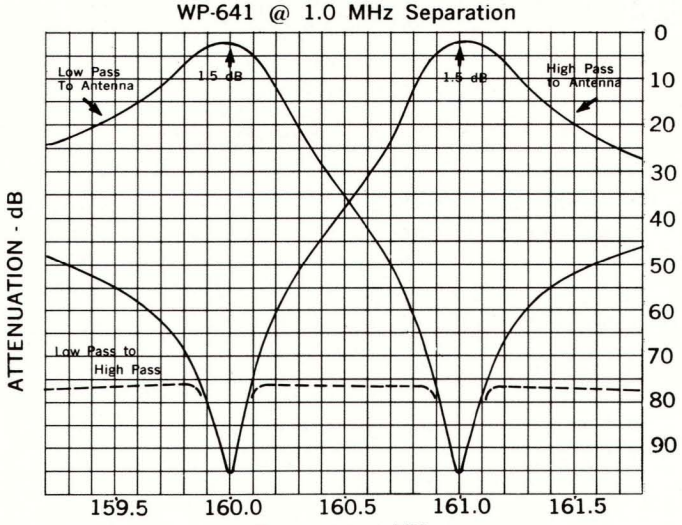
TYPICAL DUPLEX RESPONSE CURVES

WP-641 @ 0.5 MHz Separation



MODEL WP-641

WP-641 @ 1.0 MHz Separation



MODEL WP-641

ELECTRICAL DATA

	Model WP-621	Model WP-641
Tuning Range A Range	118-136 MHz	144-174 MHz
B Range	130-144 MHz	
Minimum Frequency Separation	0.5 MHz or more	0.5 MHz or more
Maximum Power Input (continuous duty)	350 watts	350 watts
Insertion Loss (Tx and Rx to antenna)		
at 0.5 MHz separation	1.5 dB	1.5 dB
at 1.0 MHz separation	1.5 dB	1.5 dB
Attenuation at Tx Freq. and Rx Freq.		
at 0.5 MHz separation	85 dB	85 dB
at 1.0 MHz or more separation	95 dB	95 dB
Isolation (midway between channels)		
with 0.5 MHz separation	55 dB	55 dB
with 1.0 MHz separation	75 dB	75 dB
Maximum VSWR (Ref. 50 ohms)	1.3 to 1	1.3 to 1
Temperature Range	−30° to +60°C	−30° to +60°C
Number of Cavity Filters	4	4

MECHANICAL DATA

	Model WP-621	Model WP-641
Dimensions:		
Individual Cavity (not incl. tuning rod)	8" OD x 29"	8" OD x 25"
Duplexer (D x W x H) with tuning rods fully extended	17" x 19" x 36"	17" x 19" x 33"
Connector Terminations (Tx, Rx, Ant)	UHF Female (Type N optional)	UHF Female (Type N optional)
Finish	Gray enamel	Gray enamel
Net Weight	42 lbs.	40 lbs.
Shipping Weight	50 lbs.	48 lbs.
Optional Cabinet	WP-205	WP-205
Dimensions, cabinet, (D x W x H)	18½" x 22½" x 41"	18½" x 22½" x 41"
Shipping Weight (Cabinet & Duplexer)	130 lbs.	128 lbs.

ORDERING INFORMATION

Model WP-621 Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-641 Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-205 Optional Cabinet

When ordering specify exact Tx and Rx frequency.

WACOM PRODUCTS

WACOM PRODUCTS

BpBr Circuit®
BANDPASS-REJECT DUPLEXERS

MIN. FREQ. SPACING: 270 KHz POWER: TO 350 WATTS

WP-642
144-174 MHz

WP-622
118-144 MHz

THESE BpBr CIRCUIT® DUPLEXERS include the use of an exclusive circuit developed by Wacom Products which provides superior suppression of spurious sideband noise between and adjacent to the duplex frequencies. When used with a high Q cavity, the BpBr Circuit provides frequency response curves with bandpass cavity characteristics at the frequency to be passed and band-reject cavity characteristics at the frequency to be attenuated. Performance characteristics improve as the frequency separation is increased. Frequency stability of the BpBr Circuit duplexer is excellent—an important factor at close frequency spacing. Each model will handle transmitter powers up to 350 watts and all models are supplied with complete cable harness and mounting frame.

ADVANTAGES OF THE BpBr CIRCUIT®: Assuming a given insertion loss at the pass frequency, comparison of the performance of the BpBr Circuit filter versus other types of bandpass-reject filters will reveal the BpBr Circuit filter provides superior bandpass characteristics near the pass frequency and a significantly wider notch at the frequency to be attenuated. These features result in superior transmitter to receiver isolation, superior protection to and from other nearby radio systems, and greater stability over a wide temperature range. In addition field tuning of a BpBr Circuit filter is considerably easier than field tuning of most other types of bandpass-reject filters.

MODEL WP-642 is designed for use with duplex stations operating in the 144-174 MHz band when the separation between transmit and receive frequencies is 270 KHz or more. It consists of six 8″ OD cavities interconnected with double shielded coaxial cable in a bandpass-reject configuration. It is generally suitable for use with all types of duplex stations, particularly the latest solid state types which require attenuation of transmitter sideband noise over a wide portion of the spectrum. Model WP-206 cabinet is available as an optional item.

MODEL WP-622 is identical to the above model but designed for use with duplex stations operating in the 118-144 MHz band when the Tx and Rx frequency separation is 270 KHz or more.

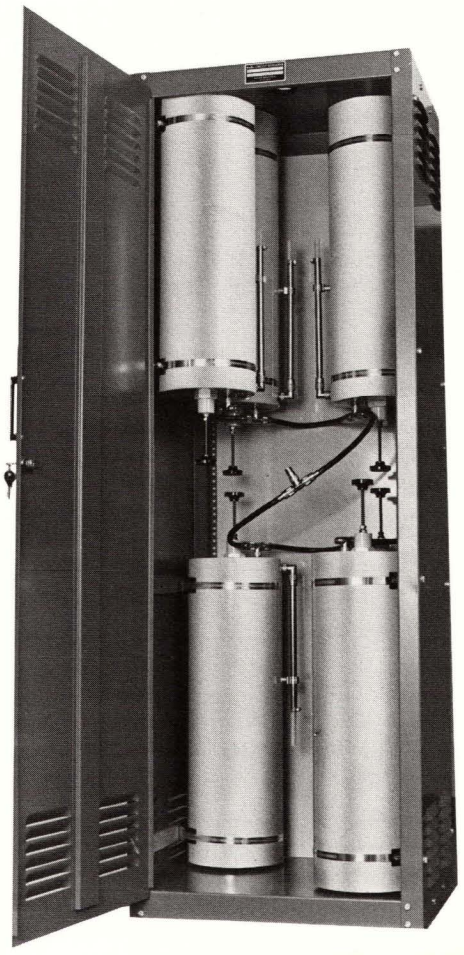
CONSTRUCTION: The top end-plate and outer conductor, made of chromated aluminum, are heliarc welded for improved conductivity. Coupling loops are made of copper; both sections of the cavity center conductor are made of silver plated copper. The tuning rod is made of Invar. Quality materials are used throughout the duplexer to assure top performance and long life. Galvanic corrosion is minimized by the use of similar materials and by passivating dissimilar materials which are in contact.

TUNING: The duplexer is factory tuned to the exact transmit and receive frequencies prior to shipment from the factory. No further field adjustment is normally required. If desired, the duplexer can be field tuned to new frequencies within its operating band by rotating the threaded tuning rod ("pass" frequency alignment) and adjusting the length of the adjustable stub ("reject" frequency alignment) of each filter.

INSTALLATION: The duplexer can be mounted in any position but is normally mounted vertically, with the tuning rods up. Double-shielded coaxial cable (such as RG-214 or RG-142) must be used to interconnect the duplexer to the transmitter and receiver chassis if maximum isolation is to be maintained. A suitable duplexer installation cable kit (Part No. 30090) is available as an optional item.

U. S. PATENT
NO. 4,080,601

Model WP-642



Optional Model WP-206 Cabinet

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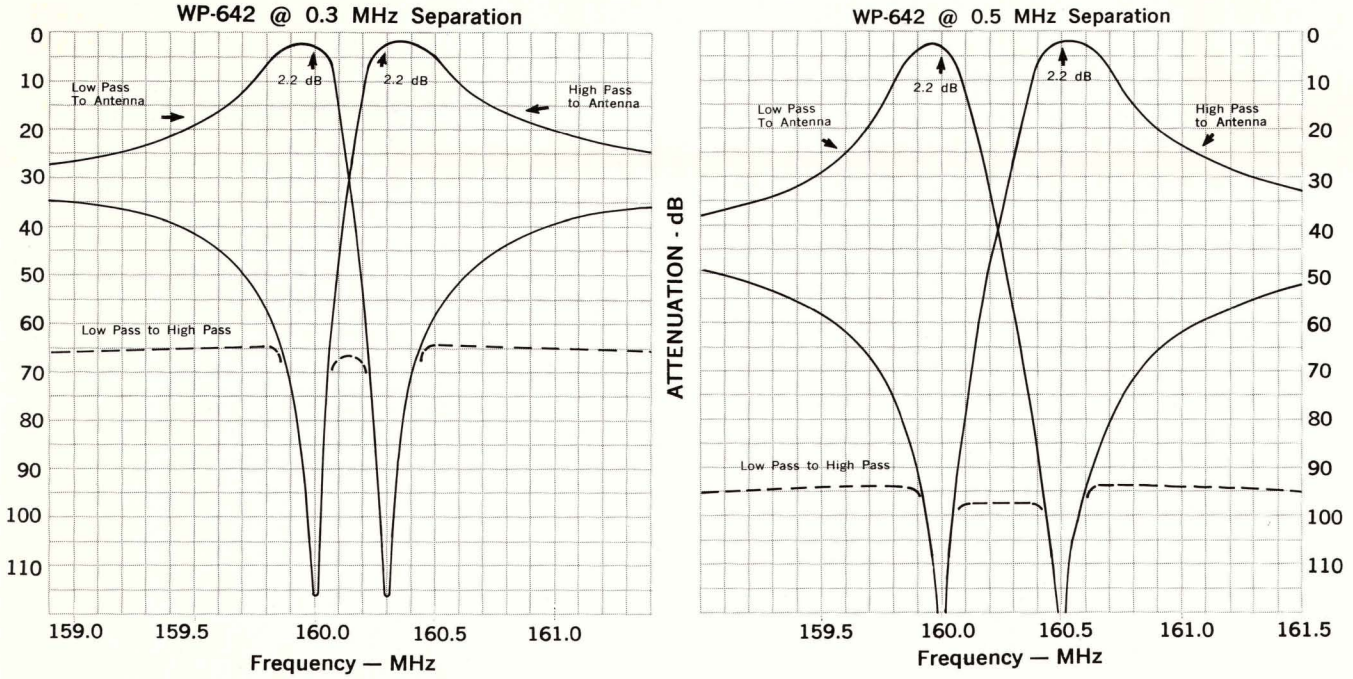
Printed in USA—7-86

WACOM PRODUCTS, INC.

TYPICAL DUPLEX RESPONSE CURVES

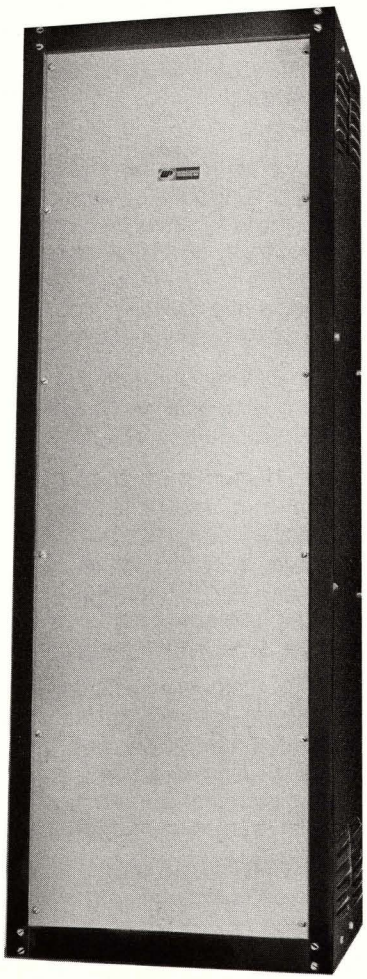


ELECTRICAL DATA

	Model WP-622	Model WP-642
Tuning Range A Range	118-136 MHz	144-174 MHz
B Range	130-144 MHz	
Minimum Frequency Separation	0.27 MHz or more	0.27 MHz or more
Maximum Power Input (continuous duty)	350 watts	350 watts
Insertion Loss (Tx and Rx to Antenna)		
with 0.3 MHz separation	2.2 dB	2.2 dB
with 0.5 MHz separation	2.2 dB	2.2 dB
Attenuation at Tx Freq. and Rx Freq.:		
with 0.27 MHz separation	115 dB	115 dB
with 0.50 MHz or more separation	120 dB	120 dB
Isolation (midway between channels)		
with 0.27 MHz separation	60 dB	60 dB
with 0.50 MHz separation	90 dB	90 dB
Maximum VSWR (Ref. 50 ohms)	1.3 to 1	1.3 to 1
Temperature Range	– 30°C to + 60°C	– 30°C to + 60°C
Number of Cavity Filters	6	6

MECHANICAL DATA

	Model WP-622	Model WP-642
Dimensions:		
Individual Cavity (not incl. tuning rods)	8″ OD x 29″	8″ OD x 25″
Duplexer (D x W x H) with tuning rods fully extended	17″ x 27″ x 36″	17″ x 27″ x 33″
Connector Terminations (TX, RX, Ant.)	UHF Female (Type N optional)	UHF Female (Type N optional)
Net Weight	68 lbs.	62 lbs.
Shipping Weight	78 lbs.	72 lbs.
Optional Cabinet	WP-206	WP-206
Dimensions, cabinet, (D x W x H)	18″ x 22″ x 67″	18″ x 22″ x 67″
Net Weight (cabinet only)	138 lbs.	138 lbs.



ORDERING INFORMATION

Model WP-622 Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-642 Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-206 Optional Cabinet

When ordering specify exact Tx and Rx frequency.

WACOM PRODUCTS

WACOM PRODUCTS

BpBr Circuit® BANDPASS-REJECT DUPLEXER

MIN. FREQ. SPACING: 500 KHz POWER TO 350 WATTS

WP-643
144-174 MHz
WP-623
118-144 MHz

U.S. PATENT No. 4,080,601

THESE BpBr CIRCUIT® DUPLEXERS include the use of an exclusive circuit developed by Wacom Products which provides superior suppression of spurious sideband noise between and adjacent to the duplex frequencies. When used with a high Q cavity, the BpBr Circuit provides frequency response curves with bandpass cavity characteristics at the frequency to be passed and band-reject cavity characteristics at the frequency to be attenuated. Performance characteristics improve as the frequency separation is increased. Frequency stability of the BpBr Circuit duplexer is excellent—an important factor at close frequency spacing. Each model will handle transmitter powers up to 350 watts and all models are supplied with complete cable harness and mounting frame.

MODEL WP-643 is designed for use with duplex stations operating in the 144-174 MHz band when the separation between transmit and receive frequencies is 500 KHz or more. It consists of two 8″ OD bandpass-reject cavities and one 8″ OD bandpass cavity in each section of the duplexer interconnected with double shielded coaxial cable. The bandpass cavity in the receiver section provides an additional margin of protection to the receiver from front-end overload and from intermodulation interference problems. The bandpass cavity in the transmitter section provides additional attenuation of transmitter sideband noise and offers further protection from generation of transmitter produced intermodulation interference. Model WP-206 indoor cabinet is available as an optional item.

MODEL WP-623 is identical to the above model but designed for use with duplex stations operating in the 118-136 MHz band (A Range) or 130-144 MHz band (B Range) when the transmit and receive frequencies are separated by 500 KHz or more.

CONSTRUCTION: The top end-plate and outer conductor, made of chromated aluminum, are heliarc welded for improved conductivity. Coupling loops are made of copper; both sections of the cavity center conductor are made of silver plated copper. The tuning rod is made of Invar. Quality materials are used throughout the duplexer to assure top performance and long life. Galvanic corrosion is minimized by the use of similar materials and by passivating dissimilar materials which are in contact.

TUNING: The duplexer is factory tuned to the exact transmit and receive frequencies prior to shipment from the factory. No further field adjustment is normally required. If desired, the duplexer can be field tuned to new frequencies within its operating band by rotating the threaded tuning rod ("pass" frequency alignment) and adjusting the length of the adjustable stub ("reject" frequency alignment) of each filter.

INSTALLATION: The duplexer can be mounted in any position but is normally mounted vertically, with the tuning rods up. Double-shielded coaxial cable (such as RG-214 or RG-142) must be used to interconnect the duplexer to the transmitter and receiver chassis if maximum isolation is to be maintained. A suitable duplexer installation cable kit (Part No. 30090) is available as an optional item.

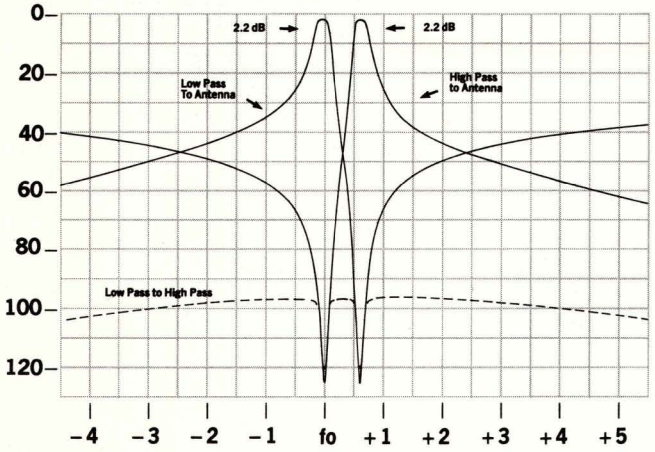
BpBr Circuit® is a Registered Trademark of Wacom Products, Inc.

Printed in USA—6-86

WACOM PRODUCTS, INC.

COMPARISON OF WP-642 AND WP-643 AT 0.6 MHz SEPARATION

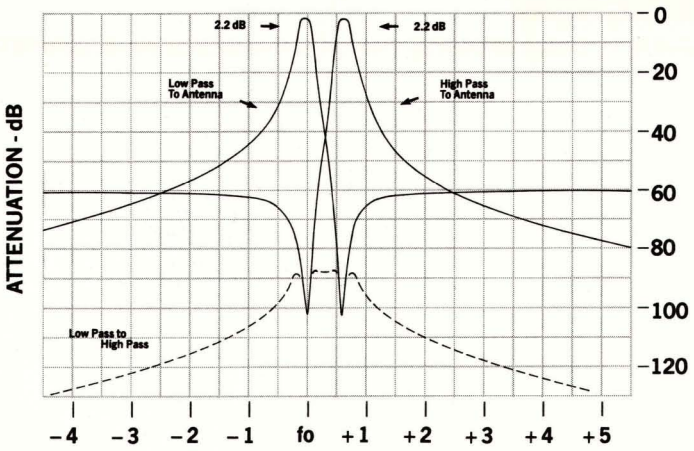
WP-642 @ 0.6 MHz SEPARATION



Frequency — MHz

WP-642

WP-643 @ 0.6 MHz SEPARATION



Frequency — MHz

WP-643

ELECTRICAL DATA

	Model WP-623	Model WP-643
Tuning Range A Range	118-136 MHz	144-174 MHz
B Range	130-144 MHz	
Minimum Frequency Separation	500 KHz or more	500 KHz or more
Maximum Power Input (continuous duty)	350 watts	350 watts
Insertion Loss (Tx and Rx to Antenna)		
at 0.5 MHz separation	2.2 dB	2.2 dB
at 0.6 MHz separation	2.2 dB	2.2 dB
at 1.0 MHz or more separation	2.2 dB	2.2 dB
Isolation (Tx Freq. to Rx. Freq.)		
at 0.5 MHz separation	97 dB	97 dB
at 0.6 MHz separation	102 dB	102 dB
at 1.0 MHz or more separation	115 dB	115 dB
Isolation (midway between channels)		
at .05 MHz separation	77 dB	77 dB
at 0.6 MHz separation	85 dB	85 dB
at 1.0 MHz or more separation	100 dB	100 dB
Maximum VSWR (Ref. 50 ohms)	1.3 to 1	1.3 to 1
Temperature Range	−30° to +60°C	−30° to +60°C
Number of Cavity Filters	6	6

MECHANICAL DATA

	Model WP-623	Model WP-643
Dimensions:		
Individual Cavity (not incl. tuning rod)	8″ OD x 29″	8″ OD x 25″
Duplexer (D x W x H) with tuning rods fully extended	17″ x 27″ x 36″	17″ x 27″ x 33″
Connector Terminations (Tx, Rx, Ant)	UHF Female (Type N optional)	UHF Female (Type N optional)
Finish	Gray enamel	Gray enamel
Net Weight	68 lbs.	62 lbs.
Shipping Weight	78 lbs.	72 lbs.
Optional Cabinet	WP-206	WP-206
Dimensions, cabinet, (D x W x H)	18″ x 22″ x 67″	18″ x 22″ x 67″
Shipping Weight (Cabinet & Duplexer)	144 lbs.	138 lbs.

ORDERING INFORMATION

Model WP-623 Duplexer with Tx on_____MHz and Rx on_____MHz

Model WP-643 Duplexer with Tx on_____MHz and Rx on_____MHz

Model WP-206 Optional Cabinet

When ordering specify exact Tx and Rx frequency.

WACOM PRODUCTS

BpBr Circuit®
BANDPASS-REJECT DUPLEXER

WACOM PRODUCTS

MIN. FREQ. SPACING: 1.0 MHz

POWER: TO 350 WATTS

WP-652
WP-653

220-300 MHz

THESE BpBr CIRCUIT® DUPLEXERS include the use of an exclusive circuit developed by Wacom Products which provides superior suppression of spurious sideband noise between and adjacent to the duplex frequencies. When used with a high Q cavity, the BpBr Circuit provides frequency response curves with bandpass cavity characteristics at the frequency to be passed and band-reject cavity characteristics at the frequency to be attenuated. Performance characteristics improve as the frequency separation is increased. Frequency stability of the BpBr Circuit duplexer is excellent—an important factor at close frequency spacing. Each model will handle transmitter powers up to 350 watts and all models are supplied with complete cable harness and mounting frame.

ADVANTAGES OF THE BpBr CIRCUIT®: Assuming a given insertion loss at the pass frequency, the BpBr Circuit filter provides superior bandpass characteristics near the pass frequency and a significantly wider notch at the frequency to be attenuated when compared with other types of bandpass-reject filters. These features result in superior transmitter to receiver isolation, superior protection to and from other nearby radio systems, and a greater stability over a wide temperature range. In addition field tuning of a BpBr Circuit filter is considerably easier than field tuning of most other types of bandpass-reject filters.

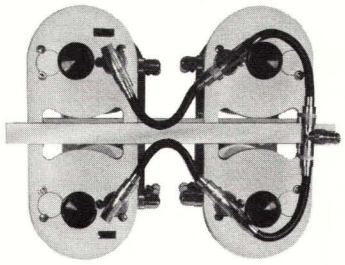
MODEL WP-652 is designed for use with duplex stations operating in the 220-300 MHz band when the separation between transmit and receive frequencies is 1.0 MHz or more. It consists of four 5″ OD cavities interconnected with double shielded coaxial cable in a bandpass-reject configuration. It is generally suitable for use with all types of duplex stations, particularly the latest solid state types which require attenuation of transmitter sideband noise over a wide portion of the spectrum.

MODEL WP-653 is a six-cavity version of the above model. It consists of two bandpass-reject cavities and one bandpass cavity in each section of the duplexer. The bandpass cavity in each section provides an additional margin of protection to and from other nearby systems. This feature is especially important if this system is to be operated in a "hostile" site where numerous other transmitters and receivers are in use.

TUNING: The duplexer is factory tuned to the exact transmit and receive frequencies prior to shipment from the factory. No further field adjustment is normally required. If desired, the duplexer can be field tuned to new frequencies within its operating band by rotating the threaded tuning rod ("pass" frequency alignment) and adjusting the length of the adjustable stub ("reject" frequency alignment) of each filter.

INSTALLATION: The duplexer can be mounted in any position but is normally mounted vertically, with the tuning rods up. Double-shielded coaxial cable (such as RG-214 or RG-142) must be used to interconnect the duplexer to the transmitter and receiver chassis if maximum isolation is to be maintained. A suitable duplexer installation cable kit (Part No. 30090) is available as an optional item.

U. S. PATENT
NO. 4,080,601



MODEL WP-652

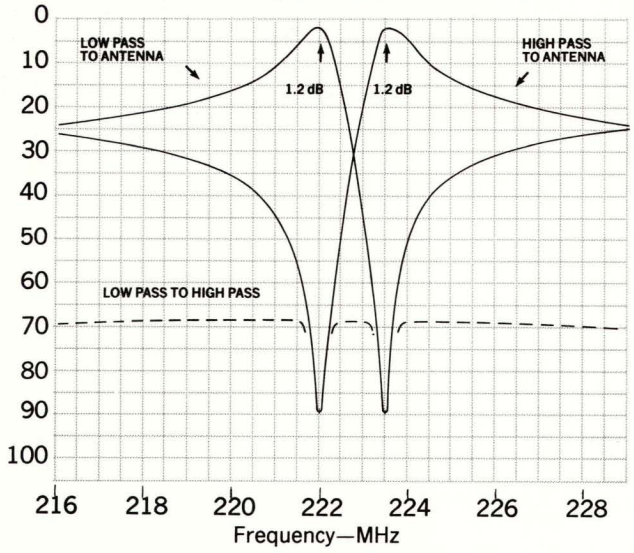
MODEL WP-653

BpBr Circuit® is a Registered Trademark of Wacom Products, Inc.

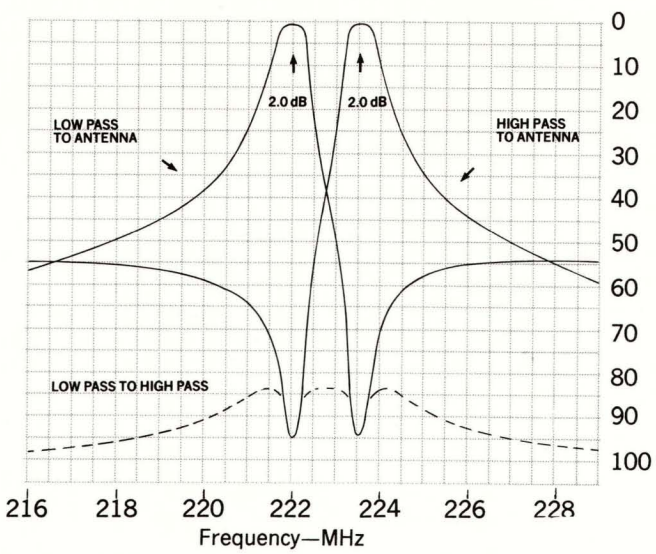
Printed in USA—9-85

TYPICAL DUPLEX RESPONSE CURVES

WP-652 @ 1.5 MHz SEPARATION



WP-653 @ 1.5 MHz SEPARATION



ELECTRICAL DATA

	Model WP-652	Model WP-653
Frequency Range	220-300 MHz	220-300 MHz
Minimum Frequency Separation	1.0 MHz or more	1.0 MHz or more
Maximum Power Input (continuous duty)	350 watts	350 watts
Insertion Loss (Tx and Rx to Antenna)		
at 1.0 MHz separation	1.5 dB	2.2 dB
at 1.5 MHz separation	1.2 dB	2.0 dB
at 5.0 MHz or more separation	1.2 dB	2.0 dB
Isolation at Tx Freq. and Rx. Freq.		
at 1.0 MHz separation	85 dB	90 dB
at 1.5 MHz separation	90 dB	95 dB
at 5.0 MHz or more separation	95 dB	100 dB
Isolation (midway between channels)		
at 1.0 MHz separation	50 dB	65 dB
at 1.5 MHz separation	60 dB	80 dB
at 5.0 MHz or more separation	85 dB	100 dB
Maximum VSWR (Ref. 50 ohms)	1.3 to 1	1.3 to 1
Temperature Range	– 30° to + 60°C	– 30° to + 60°C
Number of Cavity Filters	4	6

MECHANICAL DATA

	Model WP-652	Model WP-653
Dimensions		
Individual Cavity (not incl. tuning rods)	5″ OD x 17″	5″ OD x 17″
Duplexer (D x W x H) with tuning rods fully extended	13″ x 17″ x 22″	13″ x 22″ x 22″
Connector Terminations (Tx, Rx, Ant)	UHF Female (Type N optional)	UHF Female (Type N optional)
Finish	Gray enamel	Gray enamel
Net Weight	22 lbs.	30 lbs.
Shipping Weight	29 lbs.	38 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-652 Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-653 Duplexer with Tx on_____MHz and Rx on_____MHz

When ordering specify exact Tx and Rx frequency.

WACOM PRODUCTS

BpBr Circuit® BANDPASS-REJECT DUPLEXER

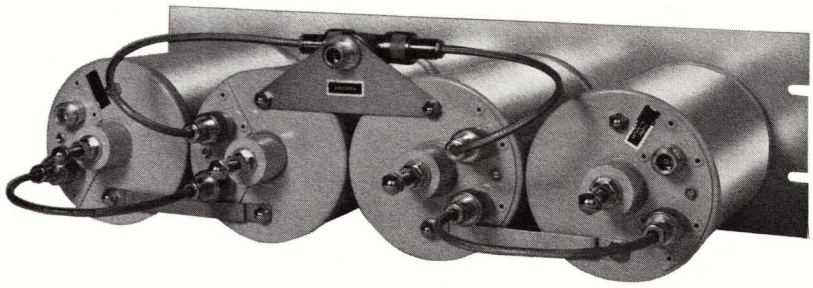
MIN. FREQ. SPACING: 3.0 MHz

POWER: TO 275 WATTS

WP-678
440-512 MHz

WP-665
406-440 MHz

U.S. PATENT No. 4,080,601



THESE BpBr CIRCUIT® DUPLEXERS include the use of an exclusive circuit developed by Wacom Products which provides superior suppression of spurious sideband noise between and adjacent to the duplex frequencies. When used with a high Q cavity, the BpBr Circuit provides frequency response curves with bandpass cavity characteristics at the frequency to be passed and band-reject characteristics at the frequency to be attenuated. Performance characteristics improve as the frequency separation is increased. Frequency stability of the BpBr Circuit duplexer is excellent. Each model will handle transmitter powers up to 275 watts and all models include a sturdy steel panel for standard 19″ rack mounting.

ADVANTAGES OF THE BpBr CIRCUIT®: Assuming a given insertion loss at the pass frequency, the BpBr Circuit filter provides superior bandpass characteristics near the pass frequency and a significantly wider notch at the frequency to be attenuated when compared with other types of bandpass-reject filters. These features result in superior transmitter to receiver isolation, superior protection to and from other nearby radio systems, and a greater stability over a wide temperature range. In addition field tuning of a BpBr Circuit filter is considerably easier than field tuning of most other types of bandpass-reject filters.

MODEL WP-678 is designed for use with duplex stations operating in the 440-512 MHz band when the separation between transmit and receive frequencies is 3.0 MHz or more. It consists of four 4″ OD cavities interconnected with double shielded coaxial cable in a bandpass-reject configuration. It is generally suitable for use with all types of duplex stations, particularly the latest solid state types which require attenuation of transmitter sideband noise over a wide portion of the spectrum.

MODEL WP-665 is identical to the above model but is designed for use with duplex stations operating in the 406-440 MHz band when the Tx and Rx frequency separation is 3.0 or more.

CONSTRUCTION: Quality materials are used throughout the duplexer to assure top performance and long life. Except for the Invar tuning rod, each cavity is constructed of silver plated copper. Galvanic corrosion is minimized by the use of similar materials or by passivating the dissimilar materials in contact.

TUNING: The duplexer is factory tuned to the exact transmit and receive frequencies prior to shipment from the factory. No further field adjustment is normally required. If desired, the duplexer can be field tuned to new frequencies within its operating band by rotating the threaded tuning rod ("pass" frequency alignment) and adjusting the variable capacitor ("reject" frequency alignment) of each filter.

INSTALLATION: The duplexer is designed for mounting in standard 19″ rack cabinets. It requires 5¼″ of vertical rack space. To maintain maximum isolation, double shielded coaxial cable should be used to interconnect the duplexer to the transmitter and receiver chassis. A suitable Duplexer Installation Kit (No. 30089) is available as an optional item.

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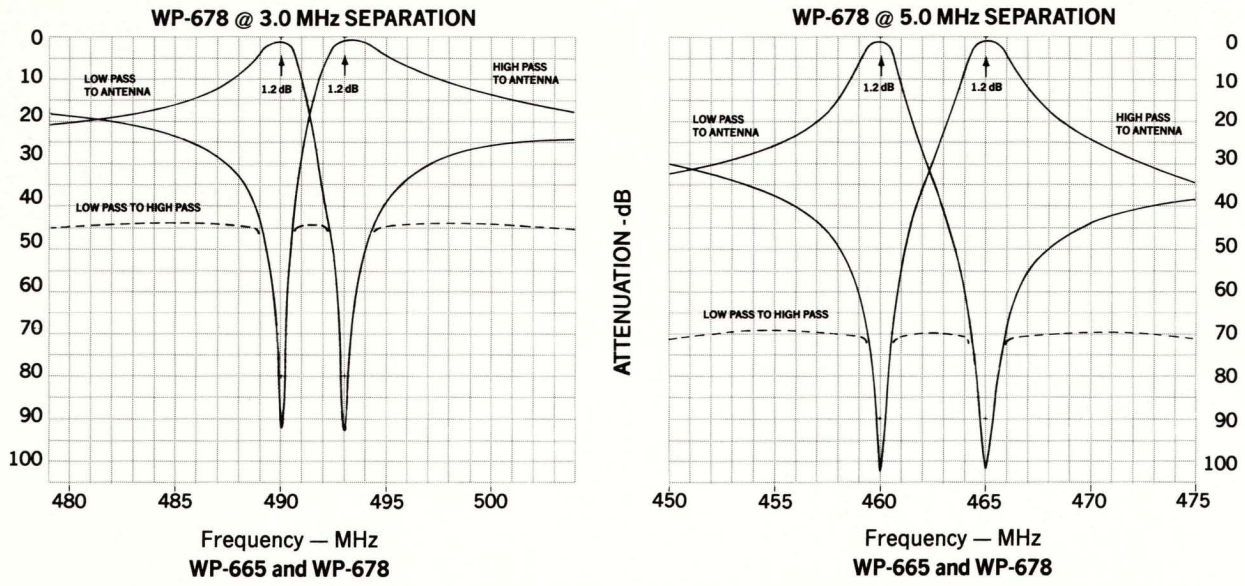
Printed in USA—3-86

TYPICAL DUPLEX RESPONSE CURVES



ELECTRICAL DATA

	Model WP-665	Model WP-678
Tuning Range A Range	400-420 MHz	440-470 MHz
B Range	420-440 MHz	470-494 MHz
C Range		488-512 MHz
Minimum Frequency Separation	3.0 MHz or more	3.0 MHz or more
Maximum Power Input (continuous duty)	275 watts	275 watts
Insertion Loss (Tx and Rx to antenna)		
at 3.0 MHz separation	1.2 dB	1.2 dB
at 5.0 MHz separation	1.2 dB	1.2 dB
Attenuation at Tx Freq. and Rx Freq.		
at 3.0MHz separation	90 dB	90 dB
at 5.0 MHz or more separation	95 dB	95 dB
Isolation (midway between channels)		
at 3.0 MHz separation	45 dB	45 dB
at 5.0 MHz or more separation	70 dB	70 dB
Maximum VSWR (Ref. 50 ohms)	1.3 to 1	1.3 to 1
Temperature Range	– 30°C to + 70°C	– 30°C to + 70°C
Number of Cavity Filters	4	4

MECHANICAL DATA

	Model WP-665	Model WP-678
Materials:		
Cavity Outer Conductor	Silver plated copper	Silver plated copper
Cavity Inner Conductor	Silver plated copper	Silver plated copper
Cavity End Plates	Silver plated copper	Silver plated copper
Cavity Tuning Rod	Invar	Invar
Dimensions:		
Cavity (not incl. tuning rod)	4″ dia. × 8½″	4″ dia. × 8″
Duplexer (H × D × W) with tuning rods fully extended	5¼″ × 11″ × 19″	5¼″ × 10½″ × 19″
Connector Terminations	Type N Female	Type N Female
Finish	Gray Enamel	Gray Enamel
Net Weight	19 lbs.	18 lbs.
Shipping Weight	26 lbs.	25 lbs.

ORDERING INFORMATION

Model WP-665 Duplexer with Tx on_____MHz and Rx on_____MHz
Model WP-678 Duplexer with Tx on_____MHz and Rx on_____MHz

When ordering specify exact Tx and Rx frequency.

BpBr Circuit®
BANDPASS-REJECT DUPLEXER

WP-686
WP-687
WP-688
WP-689
800-960 MHz

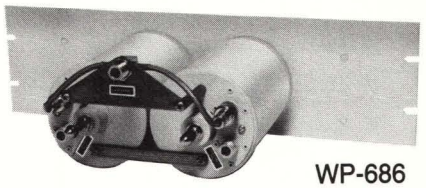
MIN. FREQ. SPACING: 3.0 MHz POWER: TO 225 WATTS

U.S. PATENT
No. 4,080,601

THESE BpBr CIRCUIT® DUPLEXERS include the use of an exclusive circuit developed by Wacom Products which provides superior suppression of spurious sideband noise between and adjacent to the duplex frequencies. When used with a high Q cavity, the BpBr Circuit provides frequency response curves with bandpass cavity characteristics at the frequency to be passed and band-reject cavity characteristics at the frequency to be attenuated. Performance characteristics improve as the frequency separation is increased. Frequency stability of the BpBr Circuit duplexers is excellent — an important factor at close frequency spacing. Some models will handle transmitter powers up to 225 watts and all models are supplied with complete cable harness and mounting panel.

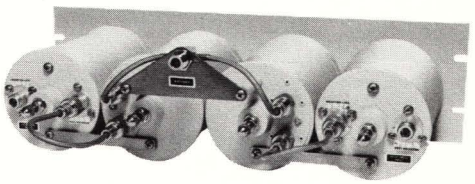
Front View

MODEL WP-686 is designed for use with duplex stations operating in the 800-960 MHz band when the separation between transmit and receive frequencies is 45 MHz or more. It consists of one 4" OD BpBr filter in each section of the duplexer. RG-142 double shielded cable is used to interconnect the filters in a bandpass-reject configuration. This model is suitable for use with many low power duplex stations.



WP-686

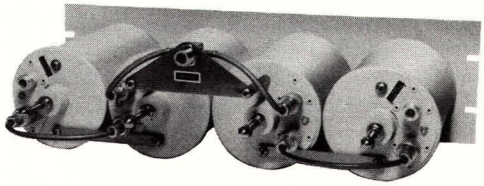
MODEL WP-687 is designed for use with duplex stations operating in the 800-960 MHz band when the separation between transmit and receive frequencies is 10 to 45 MHz, or more. It includes one 4" OD bandpass and one 4" OD BpBr filter in each section of the duplexer. Double-shielded RG-142 cable is used to interconnect the filters in a bandpass-reject duplexer configuration. The bandpass filter in the receiver section provides an additional margin of protection to the receiver from front-end overload and from intermodulation interference problems. The bandpass filter in the transmitter section provides additional attenuation of transmitter sideband noise and offers further protection from generation of transmitter produced intermodulation interference.



WP-687

MODEL WP-688 duplexer is designed for use with duplex stations operating in the 800-960 MHz band when the frequency separation between transmit and receive frequencies is from 3 to 10 MHz. (This duplexer will operate at greater frequency separations, but at 10 MHz or more separation Model WP-687 is recommended because of superior overall protection). The WP-688 includes two 4" OD BpBr filters in each section of the duplexer, interconnected with double-shielded coaxial cable in a bandpass-reject duplexer configuration. When operating at minimum frequency separation of 3 MHz, this model will handle transmitter powers up to 150 watts.

MODEL WP-689 is almost identical to the WP-688 but includes additional manufacturing processes to increase the power handling capability to 225 watts. Like the WP-688, this model is designed for use in systems with 3 to 10 MHz frequency separation.



WP-688 and WP-689

CONSTRUCTION: Quality materials are used throughout the duplexer to assure top performance and long life. Except for the Invar tuning rod, each cavity is constructed of silver plated copper. Galvanic corrosion is minimized by the use of similar materials or by passivating the dissimilar materials in contact.

TUNING: The duplexer is factory tuned to the exact transmit and receive frequencies prior to shipment from the factory. No further field adjustment is normally required. If desired, the duplexer can be field tuned to new frequencies within its operating band by rotating the threaded tuning rod ("pass" frequency alignment) and adjusting the variable capacitor ("reject" frequency alignment) of each filter.

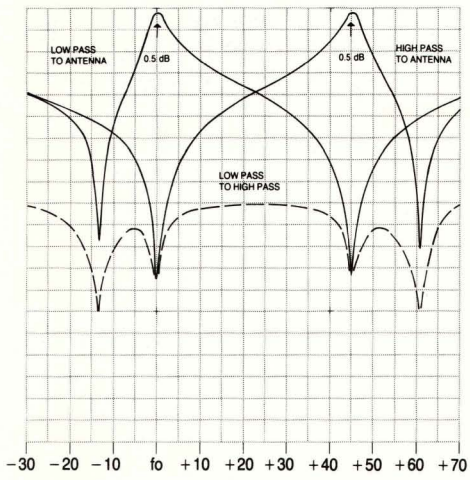
INSTALLATION: The duplexer is designed for mounting in standard 19" rack cabinets. It requires 5¼" of vertical rack space. To maintain maximum isolation, double shielded coaxial cable should be used to interconnect the duplexer to the transmitter and receiver chassis. A suitable Duplexer Installation Kit (No. 30089 or 30092) is available as an optional item.

Printed in USA — 8-90

WACOM PRODUCTS, INC.

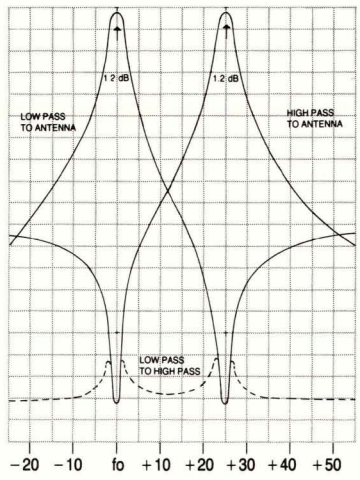
TYPICAL DUPLEX RESPONSE CURVES

WP-686 @ 45 MHz SEPARATION



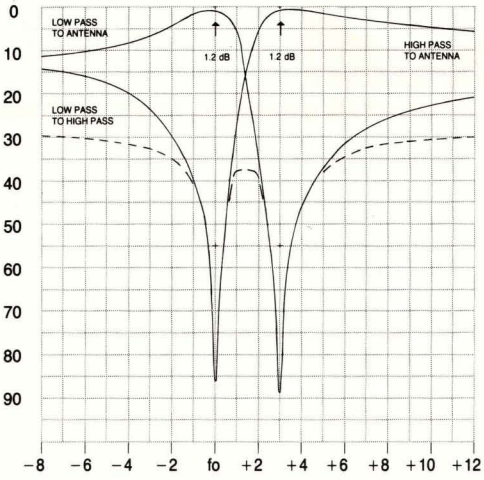
Model WP-686

WP-687 @ 25 MHz SEPARATION



Model WP-687

WP-688 @ 3 MHz SEPARATION



Model WP-688

ELECTRICAL DATA

	Model WP-686	Model WP-687	Model WP-688	Model WP-689
Frequency Range	800-960 MHz	800-960 MHz	800-960 MHz	800-960 MHz
Frequency Separation	45 MHz or more	10 to 45 MHz	3 to 10 MHz	3 to 10 MHz
Maximum Power Input (continuous duty)	200 watts	200 watts	150 watts	225 watts
Insertion Loss (Tx and Rx to antenna)	0.5 dB	1.2 dB	1.2 dB	1.2 dB
Attenuation at Tx Freq. and Rx Freq.				
at 3 MHz separation	—	—	80 dB	80 dB
at 10 MHz separation	—	80 dB	95 dB	95 dB
at 45 MHz separation	50 dB	90 dB	—	—
Isolation (midway between channels)				
at 3 MHz separation	—	—	35 dB	35 dB
at 10 MHz separation	—	55 dB	70 dB	70 dB
at 45 MHz separation	45 dB	90 dB	—	—
Maximum VSWR (Ref. 50 ohms)	1.3 to 1	1.3 to 1	1.3 to 1	1.3 to 1
Temperature Range	−30° to +70°C	−30° to +70°C	−30° to +70°C	−30° to +70°C
Number of Cavity Filters	2	4	4	4

MECHANICAL DATA

	Model WP-686	Model WP-687	Model WP-688	Model WP-689
Materials:				
Cavity Outer Conductor	Silver plated copper	Silver plated copper	Silver plated copper	Silver plated copper
Cavity Inner Conductor	Silver plated copper	Silver plated copper	Silver plated copper	Silver plated copper
Cavity End Plates	Silver plated copper	Silver plated copper	Silver plated copper	Silver plated copper
Cavity Tuning Rod	Invar	Invar	Invar	Invar
Dimensions:				
Cavity (not incl. tuning rod)	4" dia. x 6"	4" dia. x 6"	4" dia. x 6"	4" dia. x 6"
Duplexer (H x D x W) with tuning rods fully extended	5¼" x 10" x 19"	5¼" x 10" x 19"	5¼" x 10" x 19"	5¼" x 10" x 19"
Connector Terminations	Type N Female	Type N Female	Type N Female	Type N Female
Finish	Gray Enamel	Gray Enamel	Gray Enamel	Gray Enamel
Net Weight	9 lbs.	14 lbs.	14 lbs.	14 lbs.
Shipping Weight	15 lbs.	20 lbs.	20 lbs.	20 lbs.

WACOM PRODUCTS

ORDERING INFORMATION

Model WP-686 Duplexer with Tx on _____MHz and Rx on_____MHz
Model WP-687 Duplexer with Tx on _____MHz and Rx on_____MHz
Model WP-688 Duplexer with Tx on _____MHz and Rx on_____MHz
Model WP-689 Duplexer with Tx on _____MHz and Rx on_____MHz

When ordering specify exact Tx and Rx frequency.

DUPLEXER/TRANSMITTER COMBINER

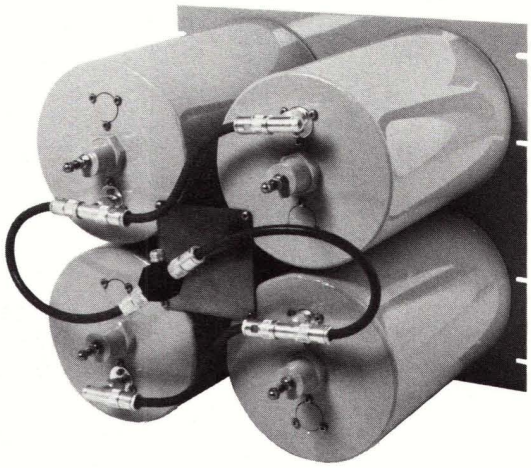
WACOM PRODUCTS

MIN. FREQ. SPACING: 2.0 MHz

POWER TO 350 WATTS

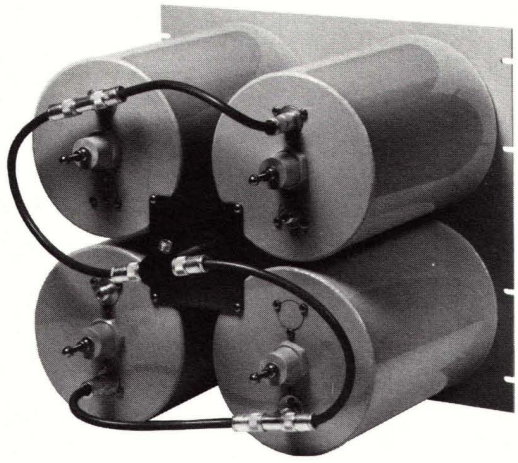
WP-691
WP-692

800-960 MHz



MODEL WP-691-SP10

MODEL WP-692-SP10



THESE BpBr CIRCUIT® DUPLEXERS include the use of an exclusive circuit developed by Wacom Products which provides superior suppression of spurious sideband noise between and adjacent to the duplex frequencies. When used with a high Q cavity, the BpBr Circuit provides frequency response curves with bandpass cavity characteristics at the frequency to be passed and band-reject cavity characteristics at the frequency to be attenuated. Performance characteristics improve as the frequency separation is increased. Frequency stability of the BpBr Circuit duplexer is excellent - an important factor at close frequency spacing. Each model will handle transmitter powers up to 350 watts and each model is supplied with complete cable harness and a 17½" x 19" panel for standard rack mounting.

MODEL WP-691 is a high performance duplexer for use with systems operating in the 800-960 MHz band. The duplexer is designed to couple a 350 watt (max) transmitter and its associated receiver into a common antenna provided the frequency separation is 2.0 to 10.0 MHz. The duplexer consists of two 8" OD BpBr filters in each section, interconnected with RG-393 double shielded cable.

MODEL WP-691-SP10 is a two-channel combiner designed to couple two 350 watt transmitters into one antenna provided the spacing between transmit frequencies is 2.0 to 10.0 MHz. It is identical to the basic model but includes a "beefed-up" antenna output connector assembly.

MODEL WP-692 duplexer is similar to the above model but includes an 8" OD bandpass and an 8" OD BpBr filter in each section. The WP-692 is designed to couple a 350 watt (max) transmitter and the associated receiver into a single antenna when the frequency separation is 10.0 MHz or more. In the transmitter section of the duplexer, the bandpass cavity provides improved attenuation of transmitter sideband noise, improved attenuation of spurious radiations, improved protection from the generation of intermodulation products. In the receiver section, the bandpass cavity provides an additional margin of protection to the receiver from front-end overload and from intermodulation interference problems.

THE WP-692-SP10 is designed to couple two 350 watt transmitters into a single antenna provided the separation between transmit frequencies is 10.0 MHz or more. At close spacing, i.e., from 2.0 to 10.0 MHz separation, this model can still be used to combine two 350 watt transmitters provided both transmitters are equipped with a single or dual junction isolator. The WP-692-SP10 is identical to the basic model but includes a "beefed-up" antenna output connector assembly.

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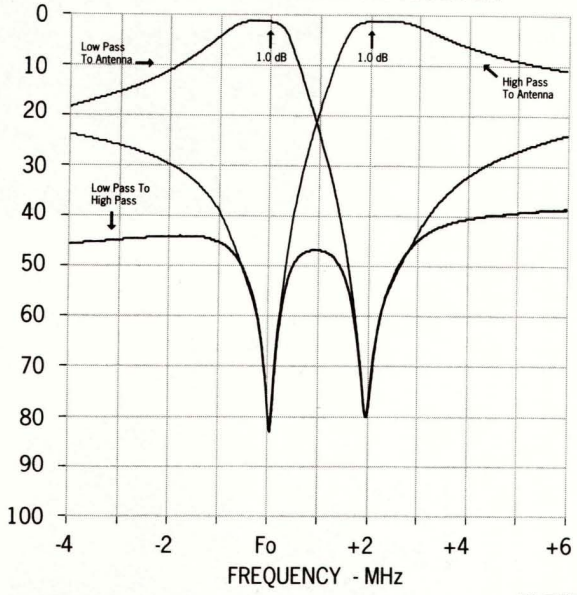
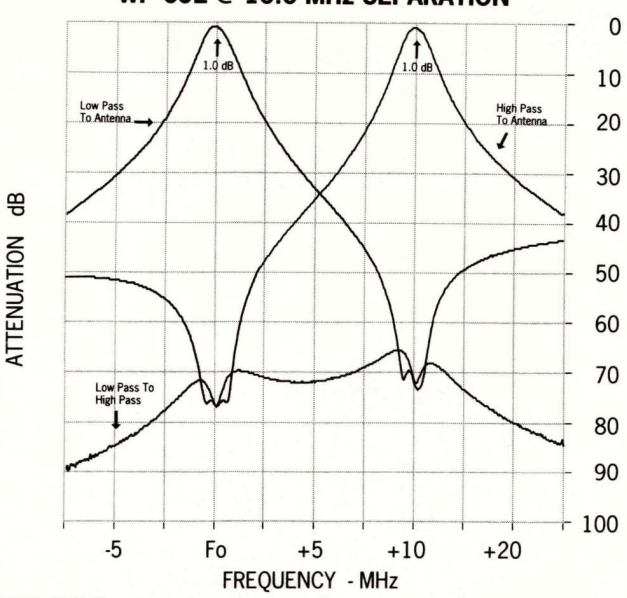
WACOM PRODUCTS, INC.

WP-691 @ 2.0 MHz SEPARATION



WP-692 @ 10.0 MHz SEPARATION



ELECTRICAL DATA

	WP-691 WP-691-SP10	WP-692 WP-692-SP10
Tuning Range	800-960 MHz	800-960 MHz
Minimum Frequency Separation	2.0 to 10.0 MHz	10.0 MHz or more
Maximum Power Input (continuous duty)	350 Watts	350 Watts
Insertion Loss (Tx and Rx to antenna)		
at 2.0 MHz separation	1.0 dB	1.2 dB
at 3.0 MHz separation	1.0 dB	1.2 dB
at 10.0 MHz separation	—	1.0 dB
Attenuation at Tx Frequency		
at 2.0 MHz separation	75 dB	55 dB
at 3.0 MHz separation	75 dB	60 dB
at 10.0 MHz or more separation	—	70 dB
Attenuation at Rx Frequency		
at 2.0 MHz separation	75 dB	55 dB
at 3.0 MHz separation	75 dB	60 dB
at 10.0 MHz or more separation	—	70 dB
Attenuation (minimum) between Tx and Rx		
at 2.0 MHz separation	40 dB	45 dB
at 3.0 MHz separation	50 dB	50 dB
at 10.0 MHz or more separation	—	65 dB
Maximum VSWR (Ref. 50 ohms)	1.5 to 1	1.5 to 1
Ambient Temperature Range	-30° to +60° C	-30° to +60° C
Number of Cavity Filters	4	4

MECHANICAL DATA

	WP-691 WP-691-SP10	WP-692 WP-692-SP10
Dimensions:		
Individual Cavity (not incl. tuning rod)	8" OD x 12"	8" OD x 12"
Duplexer (D x W x H) with tuning rods fully extended)	16" x 19" x 17½"	16" x 19" x 17½"
Connector Terminations (Tx, Rx, Ant.)	Type N Female	Type N Female
Finish	Grey enamel	Grey enamel
Net Weight	30 lbs.	30 lbs.
Shipping Weight	40 lbs.	40 lbs.

ORDERING INFORMATION

Model WP-691 Duplexer with Tx on _____ MHz and Rx on _____ MHz

Model WP-691-SP10 Combiner with Tx_1 on _____ MHz and Tx_2 on _____ MHz

Model WP-692 Duplexer with Tx on _____ MHz and Rx on _____ MHz

Model WP-692-SP10 Combiner with Tx_1 on _____ MHz and Tx_2 on _____ MHz

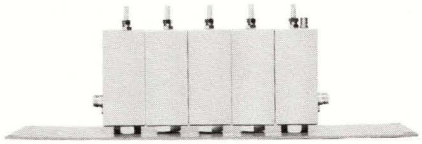
When ordering specify exact Tx and Rx frequency.

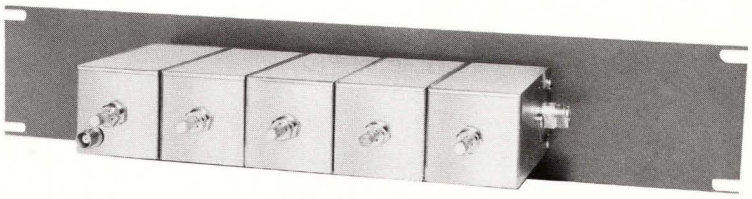
WACOM PRODUCTS

RECEIVER PRESELECTOR FILTER

WP-8795
WP-8796
WP-8797

806-821 MHz





WP-8795, WP-8796, WP-8797

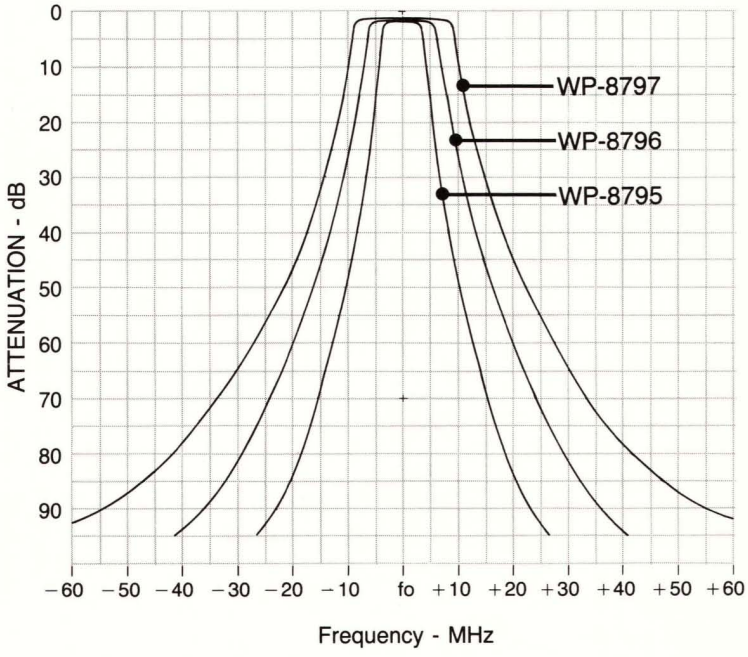
- LOW INSERTION LOSS
- EXCELLENT SELECTIVITY
- PASS BANDWIDTHS OF 5, 10, OR 15 MHz
- COMPACT SIZE

These receiver preselector filters include the use of five 2" square, ¼ wave, aperture coupled bandpass cavities. They are designed for use between the antenna and receiver multicoupler system to protect the preamplifier from interference caused by transmitter and other "off-frequency" noise sources.

Model WP-8795 can be tuned to pass a 5 MHz wide "window" in any portion of the 806-821 MHz band. Model WP-8796 can be tuned to pass a 10 MHz wide window in the 806-821 MHz band, and model WP-8797 is tuned to pass a 15 MHz wide window in this band. Each model is factory tuned to the 5, 10 or 15 MHz wide window specified by the customer.

All models are mounted on a 3½" x 19" panel suitable for rack mounting. Input and output connectors are Type N female.

TYPICAL SELECTIVITY CHARACTERISTICS



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WACOM PRODUCTS, INC.

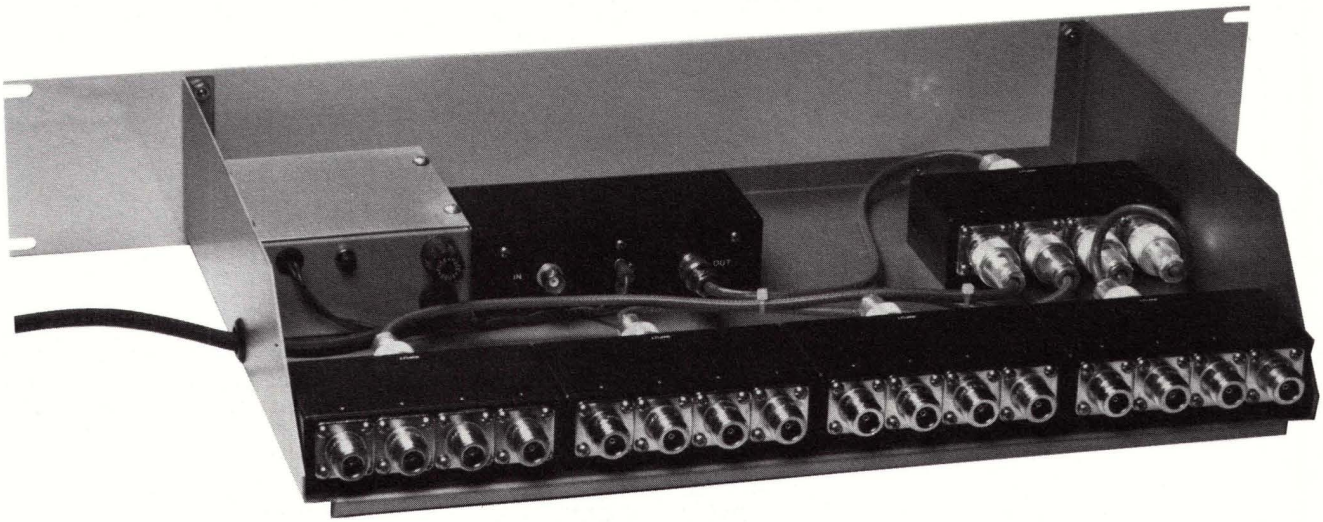
WACOM PRODUCTS

RECEIVER MULTICOUPLERS

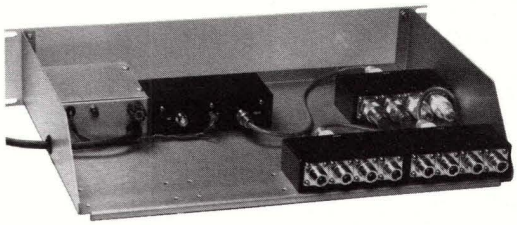
EXPANDABLE 4 TO 32 CHANNELS

WP-8835
WP-8875
WP-8890
SERIES

- LOW NOISE FIGURE
- MODULAR CONSTRUCTION
- FIELD EXPANDABLE
- HIGH INTERMOD INTERCEPT POINT
- PRESELECTOR FILTERS AVAILABLE
- 150, 450, 850 MHz MODELS



16-Channel 450 MHz



8-Channel 800 MHz

The **WP-8835, WP-8875** and **WP-8890** series multicouplers are designed to provide high performance and reliability while combining multiple receiver channels into a common antenna system. The multicoupler consists of a state-of-the-art preamplifier, power supply, and an appropriate number of power dividers to achieve the desired number of channels. Modular construction simplifies changes and/or expansion in the field. Expansion channels (in groups of four) can be easily added by adding four-way dividers. Since the multicoupler has broad band characteristics, a preselector filter should always be used. The preselector filter is not supplied as part of the multicoupler and must be ordered as a separate item.

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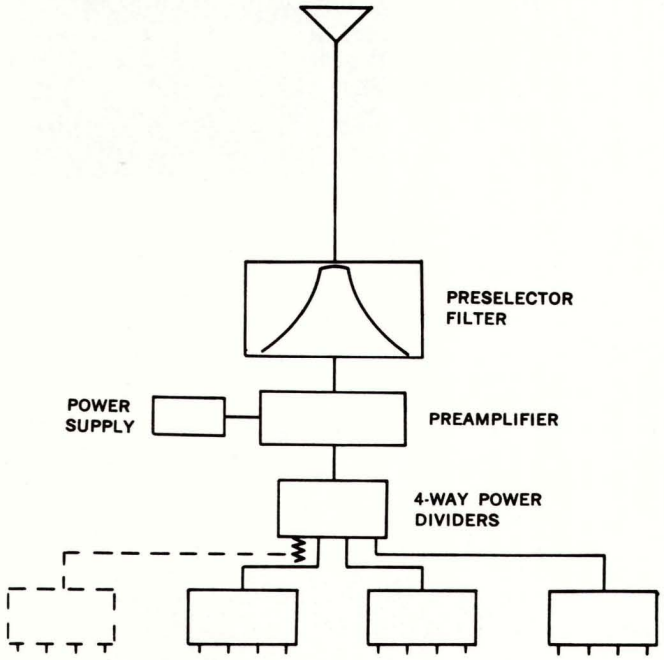
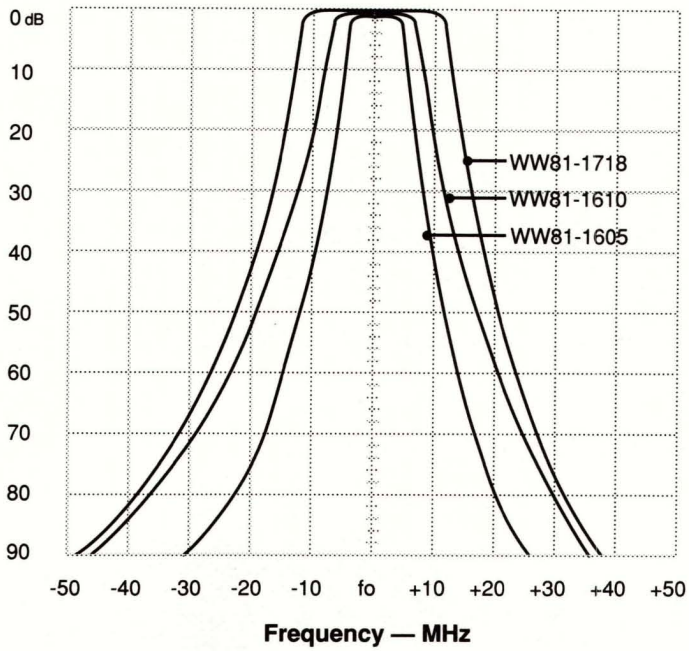
WACOM PRODUCTS, INC.

Typical Receiver Multicoupler System



Block diagram of a 12-channel multicoupler system, including preselector. Expansion to 16 channels is accomplished by replacing load at terminated port with another 4-way divider, as illustrated.

Typical Selectivity Curves For 800 MHz Preselector Filters



PRESELECTOR FILTERS

Preselector filters are used with receiver multicoupler systems to provide the required selectivity. Numerous preselector models are available to satisfy specific system requirements. Some models pass only one portion of the band, while others pass two or more portions (windows) of the band. Preselector filters are not included as part of the multicoupler package and must be ordered as a separate item.

ELECTRICAL DATA

	WP-8835 Series	WP-8875 Series	WP-8890 Series
Frequency Range	136-174 MHz	406-512 MHz	800-920 MHz
Bandwidth	Limited by Preselector	Limited by Preselector	Limited by Preselector
Multicoupler Gain (Excluding Preselector)	3.5 dB (16 Channels)	3.5 dB (16 Channels)	2 dB (16 Channels)
Noise Figure (Excluding Preselector)	3.8 dB	2.8 dB	2.8 dB
3rd Order Intercept Point	+35 dBm	+30 dBm	+30 dBm
Isolation Between Channels	20 dB or more	20 dB or more	20 dB or more
Input/Output VSWR (Ref to 50 ohms)	2 to 1/1.5 to 1	2 to 1/1.5 to 1	2 to 1/1.5 to 1
Power Input (Other Options Available)	117 VAC	117 VAC	117 VAC
Temperature Range	-30° C to +60° C	-30° C to +60° C	-30° C to +60° C
Connectors	N Female (BNC Optional)	N Female (BNC Optional)	N Female (BNC Optional)
Size	3½" x 19" x 8½"	3½" x 24" x 8½"	3½" x 19" x 8½"

ORDERING INFORMATION

150 MHz MODELS

Model WP-8835-8 (8-Channel)
Model WP-8835-12 (12-Channel)
Model WP-8835-16 (16-Channel)

450 MHz MODELS

Model WP-8875-8 (8-Channel)
Model WP-8875-12 (12-Channel)
Model WP-8875-16 (16-Channel)

800 MHz MODELS

Model WP-8890-8 (8-Channel)
Model WP-8890-12 (12-Channel)
Model WP-8890-16 (16-Channel)

TRANSMITTER COMBINER

WP-935
SERIES

150-174 MHz

WACOM PRODUCTS

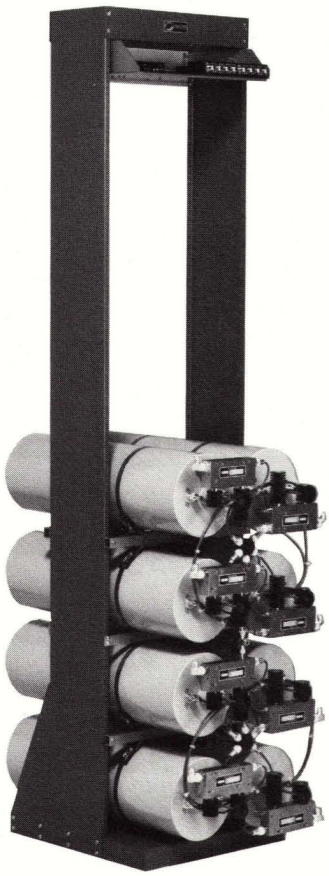
MIN. FREQ. SPACING: 200 KHz 125 WATTS PER CHANNEL

TRANSMITTER COMBINERS and Receiver Multicoupler Systems for the 150-174 MHz band are more challenging because this band does not include separated grouping of transmit and receive frequencies like most other bands. In this band, receive frequencies are oftentimes found inter-mixed with transmit frequencies only a few channels away and visa-versa. For this reason it is sometimes very difficult, if not impossible, to adequately protect all of the receivers from their associated transmitters and/or from other nearby transmitters. Separate antennas for transmitters and receivers are required in virtually all cases. Antenna separation can contribute significantly to overall system isolation especially if the antennas are mounted one above the other (collinear) and separated 20 to 50 feet, or even more. Isolation achieved by antenna separation reduces the requirement for isolation that must be provided by the transmitter combiner and the receiver multicoupler system.

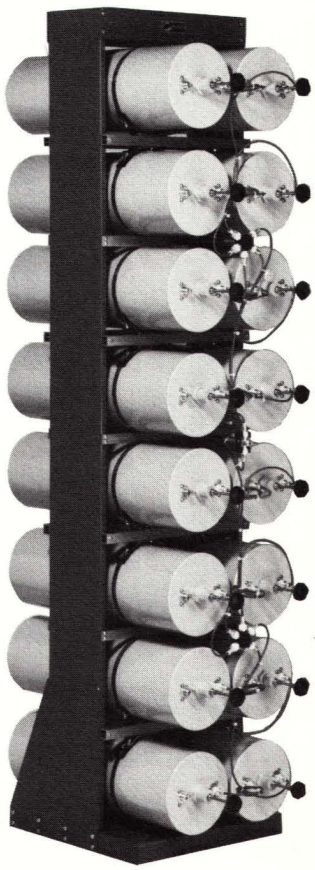
MODEL WP-935 is a low loss combiner designed to combine up to eight 150-174 MHz transmitters into a single antenna system, provided the separation between transmit frequencies is 200 KHz or more. Each combiner channel includes a high Q 8" OD bandpass cavity and dual isolator with 25 watt load termination. The combiner will handle transmitter powers up to 125 watts per channel. Expansion panels are available to add additional channels to the combiner at a later date. The combiner includes the standard 19" x 82" open relay rack.

INSERTION LOSS for a given channel is determined by (1) the frequency separation between channels in the combiner and (2) the number of channels combined into one antenna. Insertion loss will increase as the frequency separation between channels is decreased, and/or as the number of channels in the combiner is increased. Curves showing insertion loss vs. frequency separation and number of channels are shown on next page.

OPTIONAL RECEIVER MULTICOUPLER equipment is available for handling the associated receiving channels. The receiving multicoupler system must be connected to a separate antenna and, in addition, must include cavity filter preselectors to further protect the receivers from front-end overload problems caused by its associated transmitters, and/or other nearby transmitters. Since no band plan exists for the grouping of transmit and receive frequencies, the design of the preselector filter will likely change for each system. Accordingly, Wacom handles each 150-174 MHz preselector filter as a "special" and will design the filter system for each specific application...after the frequencies and antenna separation details are known. An example of an eight-channel preselector filter is pictured above.



Model WP-935-8 8-Channel Tx Combiner and Receiver Multicoupler. The Rx Multicoupler requires use of a Preselector Filter, possibly similar to the one pictured.



Special 8-Channel Receiver Pre-selector Filter for use with Rx Multicoupler. Each channel will usually require two or more cavity filters, depending on frequency spacing.

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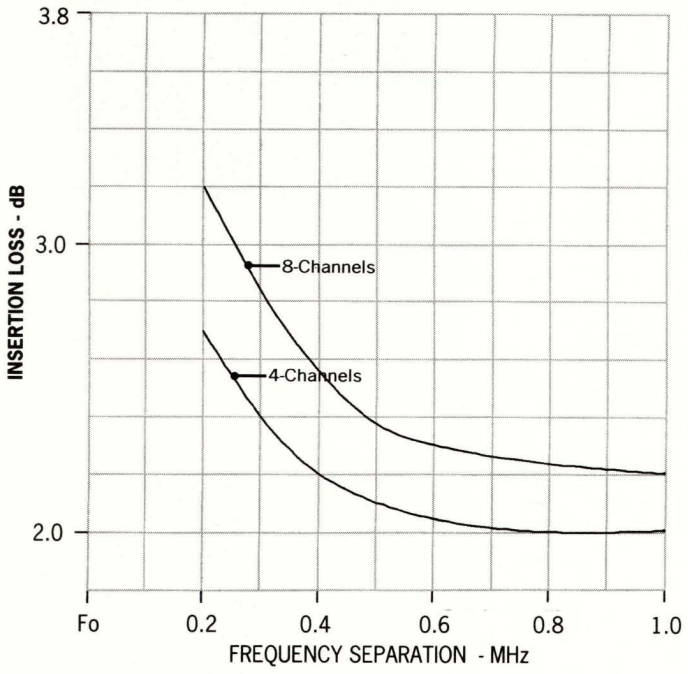
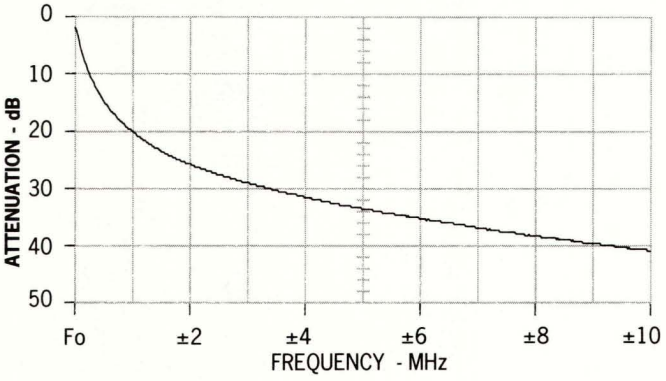
INSERTION LOSS vs. FREQ. SEPARATION

FIG. 1



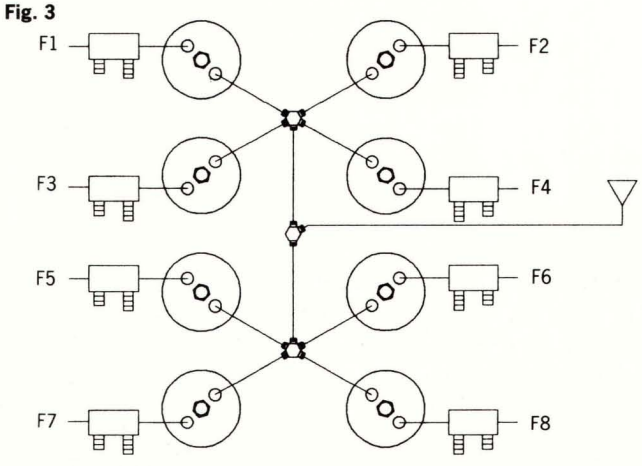
TRANSMITTER SIDEBAND NOISE ATTENUATION

FIG. 2



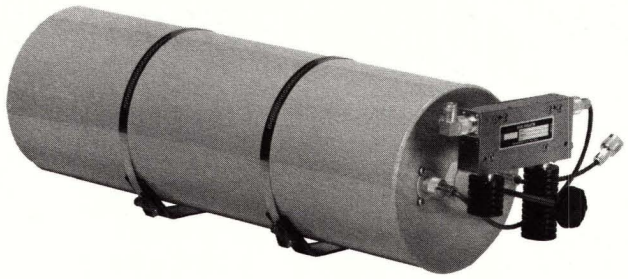
BLOCK DIAGRAM

Fig. 3



Block diagram illustrates an 8-channel combiner. Each channel includes one 8" OD cavity filter and a dual isolator with 25 watt load termination.

EXPANSION PANEL



ELECTRICAL DATA

Frequency Range	150-174 MHz
Minimum Frequency Separation	200 KHz
Insertion Loss	See Fig. 1
Transmitter Noise Attenuation	See Fig. 2
Isolation	
Tx to Tx	75 dB
Antenna to Tx	70 dB
Maximum Power Input (per Channel)	
vs. Ambient Temperature (See Note 1)	
at -30° to + 25° C	125 Watts
at +50° C	85 Watts
at +75° C	40 Watts
at +100° C	0 Watts
Maximum VSWR (Ref. 50 OHMS)	1.25 to 1
Maximum Number of Channels	8

Note 1: Power rating per channel is determined by the power handling capability of the isolator. The standard channel will handle 125 watts (@ 25°C), assuming no more than 10% of maximum power rating is entering isolator from the antenna port. Overall power handling of the combiner is also limited by power rating of the antenna tee connector. The standard Type N tee connector will handle a maximum power of approximately 600 watts. An optional 7/16 series female tee connector is available to handle a maximum power of 1200 watts or more.

MECHANICAL DATA

Standard Relay Rack (77" Panel Space)	19¼" x 82"
Combiner Overall Dimensions (W x H x D)	19¼" x 82" x 35"
Connector Terminations	Type N Female
Finish	Gray Enamel
Shipping Weight (Inc. 82" rack)	120 lbs. plus 15 lbs. per Channel

ORDERING INFORMATION

Model	Description
WP-935-(*)	Transmitter Combiner in 82" rack
XP-935	Expansion Panel for WP-935

(*)Indicate the number of channels being ordered at this time by inserting the appropriate number in this space. As an example, Model WP-935-3 should be specified to order a three-channel combiner in the standard rack.

WACOM PRODUCTS

TRANSMITTER COMBINER

MIN. FREQ. SPACING: 150 KHz 125 WATTS PER CHANNEL

WP-945
SERIES

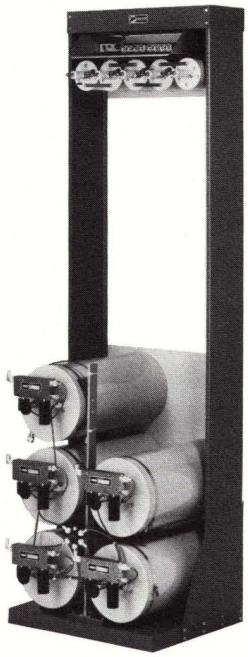
220-222 MHz

- ALL TUNING AND ALL COMPONENTS ACCESSIBLE FROM FRONT
- EFFICIENT, UNCLUTTERED MODULAR DESIGN FACILITATES FIELD SERVICE
- HIGH Q 10" OD CAVITY FOR LOW LOSS AND IMPROVED ISOLATION
- RECEIVER MULTICOUPLER AND PRESELECTOR EQUIPMENT AVAILABLE

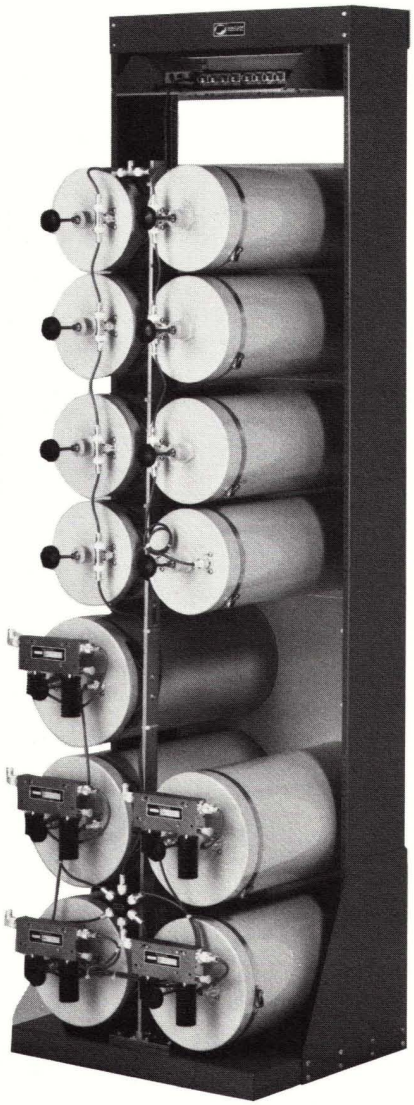
MODEL WP-945 is a low loss combiner designed to combine up to eight 220-222 MHz transmitters into a single antenna system, provided the separation between transmit frequencies is 150 KHz or more. Each combiner channel includes a high Q 10" OD bandpass cavity and dual isolator with 25 watt load termination. The combiner will handle transmitter powers up to 125 watts per channel. Expansion panels are available to add additional channels to the combiner at a later date. The combiner includes the standard 24" x 82" open relay rack.

OPTIONAL RECEIVER MULTICOUPLER equipment is available for handling the associated receiving channels. The receiver multicoupler system should be connected to a separate antenna and, in addition, must include cavity filter preselectors to further protect the receivers from front-end overload problems that might be caused by their associated transmitters and/or other nearby transmitters.

A high performance duplexer is available to couple a 5-channel transmitter combiner and a 5-channel receiver multicoupler system into a single antenna, if desired. Model WP-656 duplexer consists of eight 8" OD bandpass-reject filters (four in each section) mounted on two 17½" x 24" panels for mounting in the transmitter combiner rack as shown. If the duplexer is used, the receiver preselector filter mentioned above can be deleted since the duplexer will serve as a preselector filter. Performance specifications on the duplexer can be found on the back of this page.



Model WP-945-5 Combiner with Rx Multicoupler and Preselector Filter, for use with two antennas.



Model WP-945-5 Combiner with Rx Multicoupler and Duplexer, for use with one antenna.

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MODEL WP-658 DUPLEXER

Tuning Range	220-222 MHz
Minimum Frequency Separation	
Between closest Tx and Rx Frequencies	400 KHz
Insertion Loss	
Tx to Antenna	1.7 dB
Rx to Antenna	2.0 dB
Attenuation at Tx Freq. and Rx Freq.	
At Minimum Separation	75 dB
Maximum VSWR (Ref. 50 OHMS)	1.3 to 1
Maximum Power Input (continuous)	300 Watts
Ambient Temperature Range	-30° to +60° C
Connector Terminations	Type N Female
Number of Cavity Filters	8
Dimensions (Width x Height x Depth)	19" x 35" x 26"
Shipping Weight	70 lbs.

FIG. 1

TRANSMITTER SIDEBAND NOISE ATTENUATION

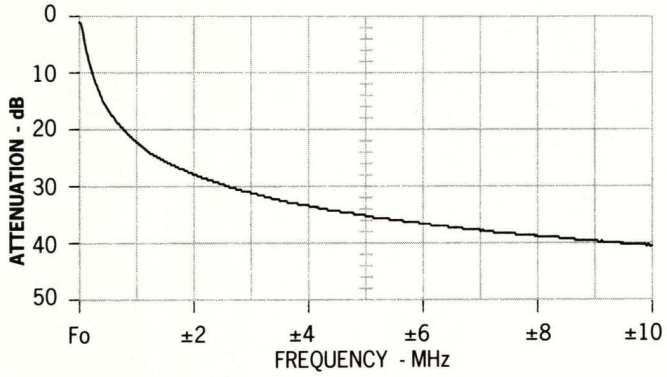
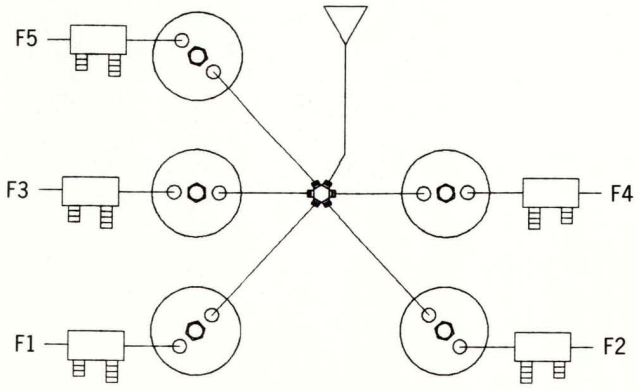


FIG. 2

BLOCK DIAGRAM



Block diagram illustrates a 5-channel combiner. Each channel includes one 10" OD cavity filter and a dual isolator with 25 watt load termination.

ELECTRICAL DATA

Frequency Range	220-222 MHz
Minimum Frequency Separation	150 KHz
Insertion Loss	
5-Channels @ 150 KHz Spacing	3.4 dB
Transmitter Noise Attenuation	See Fig. 1
Isolation	
Tx to Tx	75 dB
Antenna to Tx	70 dB
Maximum Power Input (per Channel)	
vs. Ambient Temperature (See Note 1)	
at -30° to +25° C	125 Watts
at +50° C	85 Watts
at +75° C	40 Watts
at +100° C	0 Watts
Maximum VSWR (Ref. 50 OHMS)	1.25 to 1
Maximum Number of Channels	8

Note 1: Power rating per channel is determined by the power handling capability of the isolator. The standard channel will handle 125 watts. Overall power handling of the combiner is also limited by power rating of the antenna tee connector. The standard Type N tee connector will handle a maximum power of approximately 600 watts. An optional 7/16 series female tee connector is available to handle a maximum power of 1200 watts. Maximum power rating also assumes no more than 10% of maximum power rating entering isolator from antenna port.

MECHANICAL DATA

Mounting Panels Available	
4-Channel	22¾" x 24"
Relay Racks Available (W x H x D)	
77" Panel Space	24" x 82" x 26"
Shipping Weight (Inc. 82" rack)	150 lbs. plus 17 lbs. per Channel
Connector Terminations	Type N Female
Finish	Gray Enamel

ORDERING INFORMATION

Model	Description
WP-945-(*)	Transmitter Combiner on 82" rack
XP-945	Expansion Panel for Above

(*)Indicate the number of channels being ordered at this time by inserting the appropriate number in this space. As an example, Model WP-945-5 should be specified to order a five-channel combiner in the standard rack.

NOTE: For an additional charge, the combiner can be supplied with an 82" cabinet instead of the standard rack. Contact the factory for details.

WACOM PRODUCTS

TRANSMITTER COMBINER

MIN. FREQ. SPACING: 200 KHz 125 WATTS PER CHANNEL

WP-976
SERIES

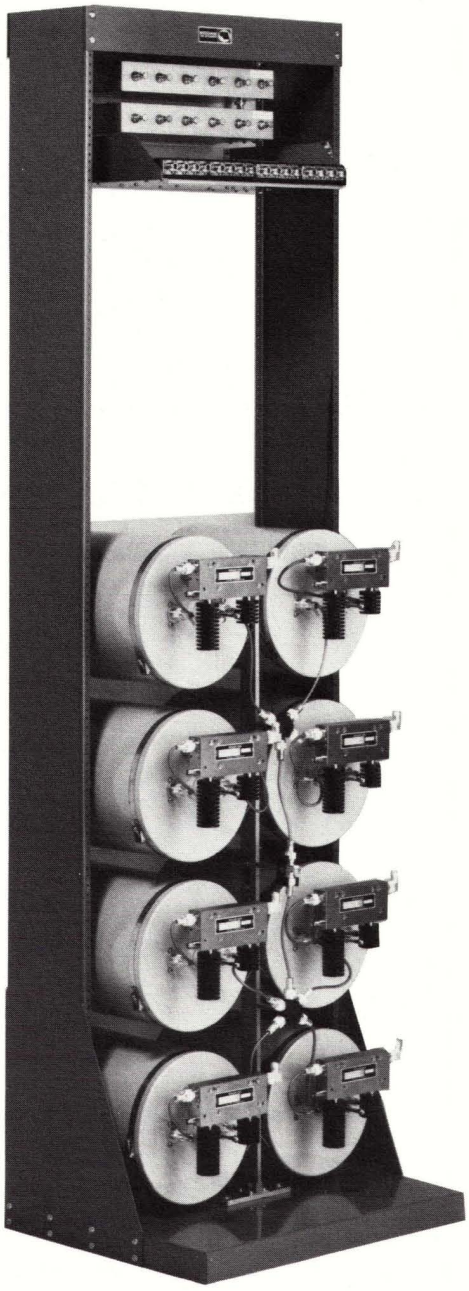
450-512 MHz

- HIGH Q 10" OD CAVITY FOR LOW LOSS AND IMPROVED ISOLATION
- EFFICIENT, UNCLUTTERED MODULAR DESIGN FACILITATES EXPANSION AND FIELD SERVICE
- ALL TUNING AND ALL COMPONENTS ACCESSIBLE FROM FRONT
- RECEIVER MULTI-COUPLER AND PRESELECTOR EQUIPMENT AVAILABLE

MODEL WP-976 is a low loss combiner designed to combine up to ten 450-512 MHz transmitters into a single antenna system, provided the separation between transmit frequencies is 200 KHz or more. Each combiner channel includes a high Q 10" OD bandpass cavity and dual isolator with 25 watt load termination. The combiner will handle transmitter powers up to 125 watts per channel. Expansion panels are available to add additional channels to the combiner at a later date. The combiner includes the standard 24" x 82" open relay rack.

INSERTION LOSS for a given channel is determined by (1) the frequency separation between channels in the combiner and (2) the number of channels combined into one antenna. Insertion loss will increase as the frequency separation between channels is decreased, and/or as the number of channels in the combiner is increased. Curves showing insertion loss vs. frequency separation and number of channels are shown on next page.

OPTIONAL RECEIVER MULTI-COUPLER equipment is available for handling the associated receiving channels. The receiving multi-coupler system should be connected to a separate antenna and, in addition, should include cavity filter preselectors to further protect the receivers from front-end overload problems that might be caused by nearby transmitters.



Model WP-976-8 eight channel transmitter combiner and 16-channel Receiver Multi-coupler and preselector system, mounted in a 24" x 82" open rack.

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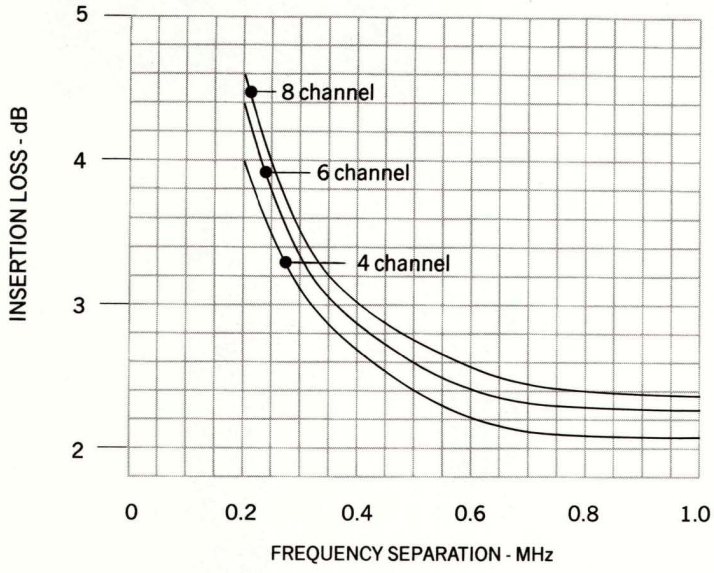
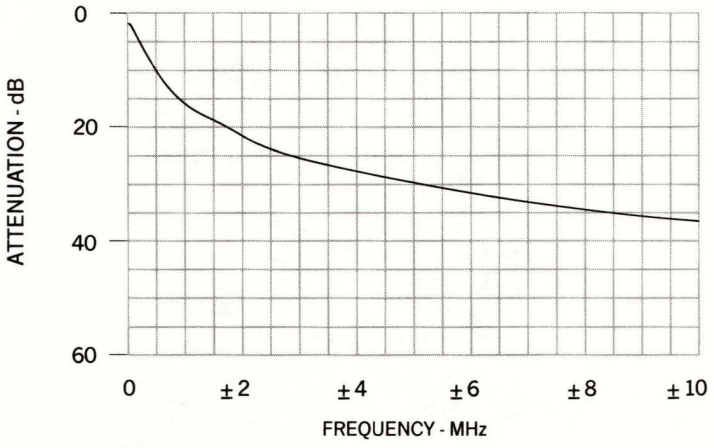
INSERTION LOSS vs. FREQ. SEPARATION

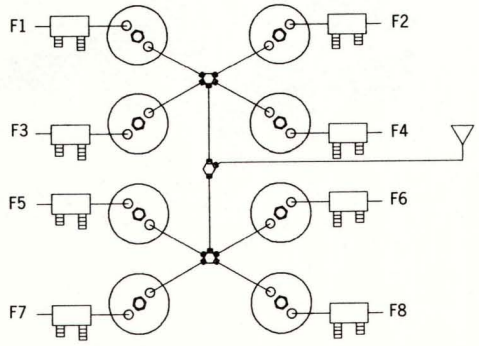
Fig. 1



TRANSMITTER NOISE ATTENUATION vs. FREQUENCY SEPARATION

Fig. 2





Block diagram illustrates an 8-channel combiner. Each channel includes one 10" OD cavity filter and a dual isolator with 25 watt load termination.

ELECTRICAL DATA

Frequency Range ..... 450-512 MHz
Minimum Frequency Separation ..... 200 KHz
Insertion Loss ..... See Fig. 1
Transmitter Noise Attenuation ..... See Fig. 2
Isolation
Tx to Tx ..... 75 dB
Antenna to Tx ..... 70 dB
Maximum Power Input (per Channel) ..... 125 Watts*
Maximum VSWR (Ref. 50 OHMS) ..... 1.25 to 1
Temperature Range ..... -30° to + 60° C
Maximum Number of Channels 10

*Power rating per channel is determined by the power handling capability of the isolator. The standard channel will handle 125 watts. Overall power handling of the combiner is also limited by power rating of the antenna tee connector. The standard Type N tee connector will handle a maximum power of approximately 600 watts. An optional 7/16 series female tee connector is available to handle a maximum power of 1200 watts.

MECHANICAL DATA

Mounting Panels Available
4-Channel ..... 22¾" x 24"

Relay Racks Available
77" Panel Space ..... 24" x 82"

Shipping Weight (Inc. 82" rack) ..... 150 Lbs. plus 15 Lbs. per Channel

Connector Terminations ..... Type N Female

Finish ..... Gray Enamel

ORDERING INFORMATION

Model	Description
WP-976-(*)	Transmitter Combiner on 82" rack
XP-976	Expansion Panel for Above

(*)Indicate the number of channels being ordered at this time by inserting the appropriate number in this space. As an example, Model WP-976-3 should be specified to order a three-channel combiner in the standard rack.

NOTE: For an additional charge, the combiner can be supplied with an 82" cabinet instead of the standard rack. Contact the factory for details.

WP-994 SERIES

TRANSMITTER COMBINER

MIN. FREQ. SPACING: 300 KHz

UP TO 350 WATTS

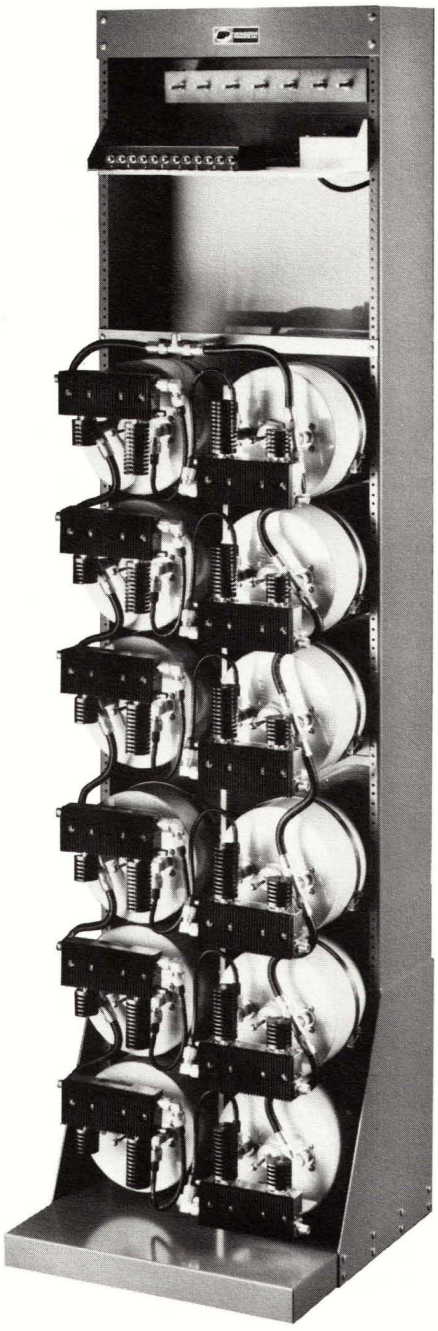
850-960 MHz

- HIGH PERFORMANCE FIXED TUNED BROADBAND ISOLATORS. AVAILABLE FOR 150, 250 OR 350 WATT TRANSMITTERS
- UNCLUTTERED MODULAR DESIGN FACILITATES EXPANSION AND FIELD SERVICE
- ALL TUNING AND ALL COMPONENTS AVAILABLE FROM FRONT
- CAN BE SUPPLIED IN RELAY RACK OR ENCLOSED CABINET

MODEL WP-994 is a high performance combiner designed to couple up to twelve transmitters into a single antenna system. Each combiner channel includes a high Q 8" OD bandpass cavity and dual junction isolator with loads. Minimum suggested frequency separation between transmitter channels is 300 KHz. Various expansion panels are available for adding additional channels to the combiner at a later date. The combiner includes the standard 19" wide by 75" high relay rack, but larger racks and/or several enclosed cabinets are available as options.

POWER RATING: Several factors are involved in determining the power handling capability of the combiner. First, each isolator and associated load must be appropriate for use with its associated transmitter. The isolators supplied with the standard combiner will handle transmitters with output power of up to 150 watts. For higher power transmitters, optional 250 and 350 watt isolators are available. Next, the 8" OD cavity filters and interconnecting cables are designed to handle 350 watt transmitters. Finally the antenna tee connector which combines the two combiner sections is a Type N connector and thus limited to a maximum power of approximately 600 watts. Take for example, a combiner being used to combine ten 100 watt transmitters that are spaced 1.0 MHz apart. The insertion loss chart (Fig. 1) indicates a loss of 2.6 dB (45% power loss) for each channel, therefore, the total power level at the output connector will be 550 watts. If several of the transmitters were higher power models, then the number of channels would have to be reduced to avoid exceeding the power rating of the final antenna connector. As an alternative, an LC type antenna output connector, capable of handling up to 1200 watts, is available as an optional item.

INSERTION LOSS for a given channel is determined by (1) the frequency separation between channels in the combiner and (2) the number of channels combined into one antenna. Insertion loss will increase as the frequency separation between channels is decreased, and/or as the number of channels in the combiner is increased. Curves showing insertion loss vs. frequency separation and number of channels are shown on next page.



Model WP-994-12 twelve channel transmitter combiner and twelve channel receiver multicoupler and preselector filter system mounted in 70" rack.

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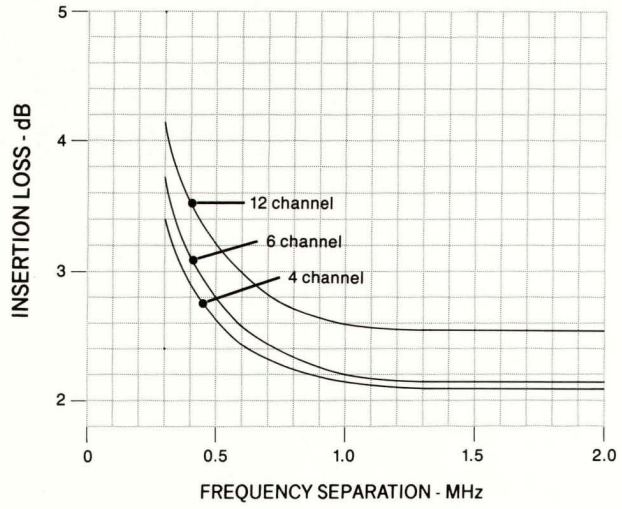
Fig. 1 **INSERTION LOSS vs. FREQ. SEPARATION**



ELECTRICAL DATA

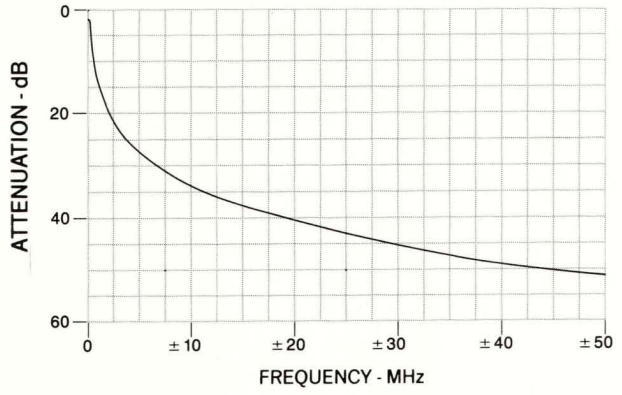
Frequency Range ..... 850-960 MHz
Minimum Frequency Separation ..... 300 KHz
Insertion Loss ..... See Fig. 1
Transmitter Noise Attenuation ..... See Fig. 2
Isolation
Tx to Tx ..... 75 dB
Antenna to Tx ..... 70 dB
Maximum Power Input (per Channel) ..... 150 Watts*
Maximum VSWR (Ref. 50 OHMS) ..... 1.25 to 1
Temperature Range ..... − 30° to + 60°C
Maximum Number of Channels 12

*Power rating per channel is determined by the power handling capability of the isolator. The standard channel will handle 150 watts. Optional expansion panels are available to handle 250 and 350 watt transmitters.

*Overall power handling of the combiner is also limited by power rating of the antenna tee connector. The standard Type N tee connector will handle a maximum power of approximately 600 watts. An optional type LC female tee connector is available to handle a maximum power of 1200 watts.

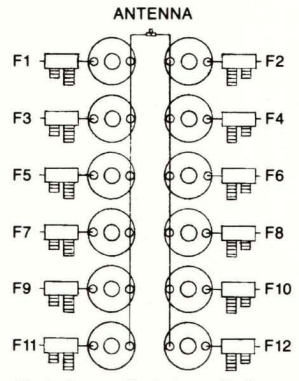
TRANSMITTER NOISE ATTENUATION vs. FREQUENCY SEPARATION

Fig. 2



MECHANICAL DATA

Mounting Panels Available
2-Channel ..... 8¾" x 19"
6-Channel ..... 26¼" x 19"
Relay Racks Available
70" Panel Space ..... 19" x 75"
77" Panel Space ..... 19" x 82"
Shipping Weight (Inc. 70" rack) ..... 105 Lbs. plus 11 Lbs. per Channel
Connector Terminations ..... Type N Female
Finish ..... Gray Enamel



Block diagram illustrates a 12-channel combiner. Each channel includes one 8" OD cavity filter and a dual isolator with 25 watt load termination.

ORDERING INFORMATION

WP-994-(*)	Transmitter Combiner in 70" Relay Rack
XP-994-B22A	Expansion Panel, 150 Watt Isolator with 15 & 25 Watt Loads
XP-994-B23A	" " " " " with 15 & 60 " "
XP-994-L41A	Expansion Panel, 250 Watt Isolator with 15 & 60 Watt Loads
XP-994-L42A	" " " " " with 15 & 100 " "
XP-994-R61A	Expansion Panel, 350 Watt Isolator with 25 & 100 Watt Loads
XP-994-R62A	" " " " " with 25 & 150 " "
Option R77-994	Deletes 70" Rack and Adds 77" Relay Rack
Option C65-994	Deletes 70" Rack and Adds 65" Indoor Cabinet
Option LC-01-994	LC Tee Connector Assembly

WACOM PRODUCTS

*Indicate the number of channels being ordered at this time by inserting the appropriate number in this space. As an example, Model WP-994-3 should be specified to order a three-channel combiner in the standard 70" rack. If the 77" rack is desired, order WP-994-3—Option R77-994. Each transmitter frequency must be specified.

The standard model, i.e., WP-994-( ) includes 150 watt isolators. If one or more of the higher power expansion panels is desired, it should be ordered as an additional expansion panel. For example, if a combiner is being ordered to handle three 150 watt channels, one 250 watt channel and one 350 watt channel, it should be ordered as one WP-994-3 Tx Combiner, plus one XP-994-L41A Expansion Panel and one XP-994-R61A Expansion Panel. Be certain to identify which frequency goes with each high power channel.

WP-9910

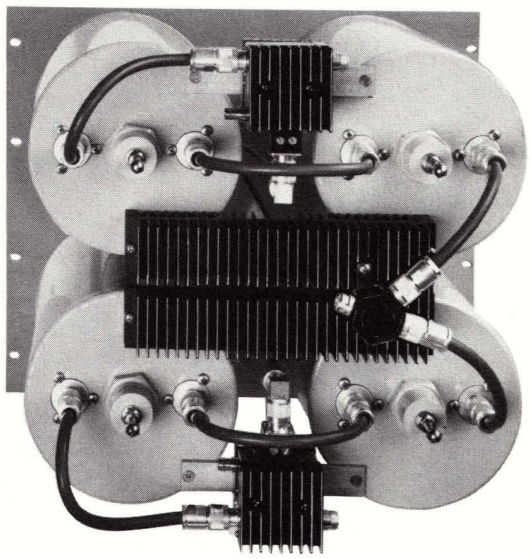
TRANSMITTER COMBINER

WACOM PRODUCTS

MIN. FREQ. SPACING: 1.2 MHz 300 WATTS PER CHANNEL

928-932 MHz

THE WP-9910 is a two-channel transmitter combiner specifically designed for the paging industry for combining two 300 watt (max) multi-frequency transmitters into a single antenna, provided the spacing between the closest transmit frequencies is 1.2 MHz or more. The two bandpass cavities in each channel provide the means for adjusting each channel to pass an unusually broad passband.....up to 700 KHz passband for the low frequency channel and up to 900 KHz passband for the high frequency channel. Performance improves as the spacing between channels increases and/or as the width of the passband decreases. The combiner consists of a 350 watt rated single junction isolator (with 100 watt load termination) and two 7" OD bandpass cavities in each channel, interconnected with RG-393 cable. All items are mounted on a 15¾" x 19" panel for mounting in a standard 19" rack.



ISOLATION. This combiner provides 50 dB isolation between the two transmitter ports. This amount of isolation is not sufficient and thus must be supplemented by the use of external single or dual junction isolators installed in the output of each transmitter.

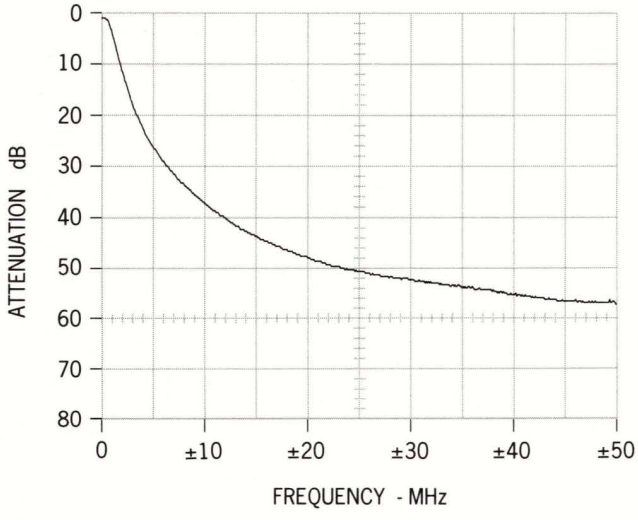
ELECTRICAL & MECHANICAL DATA

Frequency Range	928-932 MHz
Minimum Frequency Separation	1.2 MHz
Insertion Loss (at min. freq. separation)	
with 300 KHz Passband	1.3 dB
with 600 KHz Passband	1.3 dB
with 900 KHz Passband	1.4 dB
Transmitter Noise Attenuation	See Fig. 1
Isolation	
Tx to Tx	50 dB
Antenna to Tx	40 dB
Maximum Power Input (per Channel)	
vs. Ambient Temperature (See Note 1)	
at -30 to +25° C	300 Watts
at +50° C	200 Watts
at +75° C	100 Watts
at +100° C	0 Watts
Maximum VSWR (Ref. 50 OHMS)	1.3 to 1
Output Load Terminations	100 Watts
Dimensions (Width x Height x Depth)	19" x 15¾" x 17½"
Connector Terminations	Type N Female
Finish	Gray Enamel
Shipping Weight	40 lbs.

NOTE 1: Assumes no more than 10% of maximum power rating entering isolator from antenna port.

FIG. 1

TRANSMITTER SIDEBAND NOISE ATTENUATION



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WACOM PRODUCTS

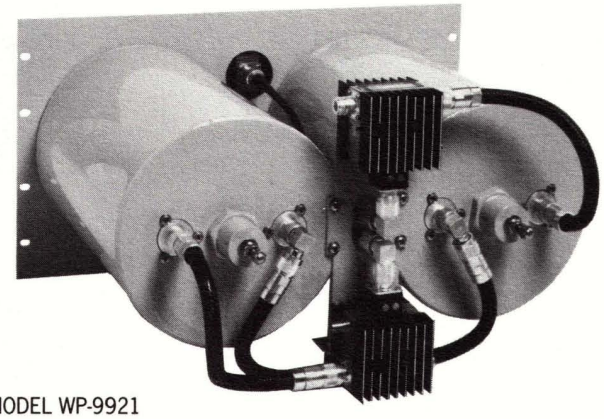
TRANSMITTER COMBINERS

POWER TO 300 WATTS

WP-9920
WP-9921
WP-9922

925-960 MHz

- MODELS FOR FREQUENCY SEPARATIONS OF 0.5 THROUGH 30.0 MHz
- COMPACT DESIGN
- HIGH POWER HANDLING
- ALL ADJUSTMENTS ACCESSIBLE AT FRONT



MODEL WP-9921

These high performance two-channel transmitter combiners are designed for use with systems operating in the 925-960 MHz band to couple two high power transmitters into a single antenna. The transmitters must be equipped with single or dual junction isolators in order to supplement the isolation provided by the combiner. Six models are available to handle different transmitter power levels and different spacings between transmit frequencies. All models include a single junction isolator with 150 watt load and an 8" OD cavity filter in each channel. All models are supplied with RG-393 and/or ½" superflex interconnect cables and all models feature compact mounting on a 10½" x 19" panel for standard rack mounting.

THE FERRITE ISOLATORS used in these combiners provide high performance characteristics not found in other products. These are fixed tuned models that provide greater isolation over a broad bandwidth. The solid compact design results in improved heat conductivity to the external heat sinks, thus improving power handling capability and frequency stability. The isolators are adjusted at the factory for optimum performance at the specified "center" frequency within the 925-960 MHz band. A sampler port is provided on all isolator models. The sampler port consists of a probe positioned in the output-to-dummy load path of the isolator to sample energy being reflected to the load port. (The probe is decoupled from the path by approximately 30 dB). With a suitable detector (spectrum analyzer) attached, the sampler port provides a convenient means for tuning the cavity following the isolator.

Model WP-9920 is designed to couple two 250 watt (max) transmitters into a single antenna provided the spacing between the two transmit frequencies is 0.5 to 1.0 MHz, and provided further that both transmitters are equipped with single or dual junction isolators. The combiner consists of a 250 watt rated single junction isolator (with 150 watt load) and an 8" OD notch filter in each channel. Model WP-9920-A is identical to this model except it includes a 350 watt rated isolator (with 150 watt load) and can be used to couple two 300 watt transmitters into a common antenna provided both transmitters are equipped with a single or dual junction isolator.

Model WP-9921 is designed to couple two 250 watt (max) isolator-equipped transmitters into a common antenna when the spacing between transmit frequencies is 1.0 to 2.0 MHz. It consists of a 250 watt rated single junction isolator (with 150 watt load) and an 8" OD bandpass cavity in each channel. Model WP-9921-A is identical but includes a 350 watt rated isolator (with 150 watt load) and can be used to couple two 300 watt isolator-equipped transmitters into a single antenna.

Model WP-9922 is designed to couple two 250 watt (max) isolator-equipped transmitters into a common antenna when the separation between transmit frequencies is 2.0 to 30.0 MHz. It consists of a 250 watt rated isolator (with 150 watt load) and an 8" OD bandpass cavity in each channel. Model WP-9922-A is identical except it includes a 350 watt rated isolator (with 150 watt load) and can be used to combine two 300 watt isolator-equipped transmitters.

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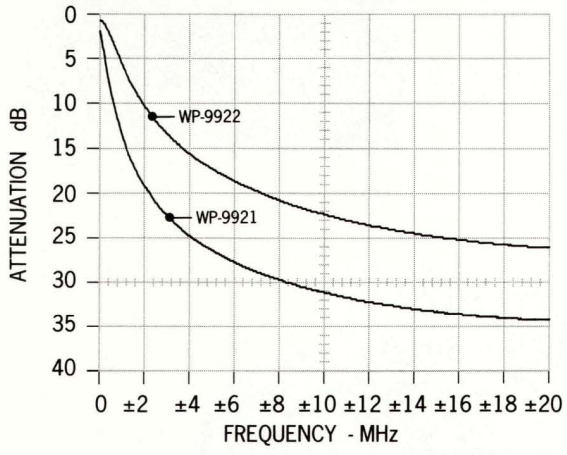
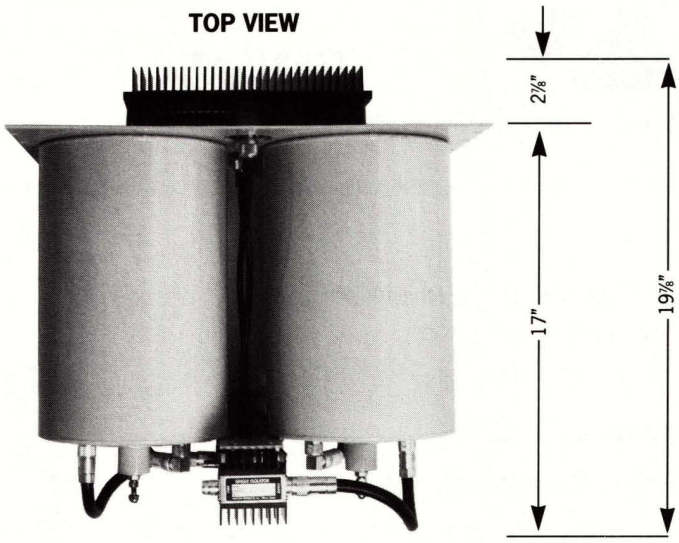
TRANSMITTER SIDEBAND NOISE ATTENUATION



TOP VIEW



ELECTRICAL DATA

	WP-9920	WP-9921	WP-9922
Frequency Range	925 to 960 MHz	925 to 960 MHz	925 to 960 MHz
Frequency Separation	0.5 to 1.0 MHz	1.0 to 2.0 MHz	2.0 to 30.0 MHz
Insertion Loss			
at 0.5 MHz Separation	1.2 dB	1.5 dB	—
at 1.0 MHz Separation	1.2 dB	1.5 dB	—
at 30.0 MHz Separation	—	—	1.0 ~~1.5~~ dB
Tx To Tx Isolation			
at 0.5 MHz Separation	50 dB	—	—
at 1.0 MHz Separation	50 dB	60 dB	60 dB
at 30.0 MHz Separation	—	—	80 dB
Tx Noise Attenuation			
at ± 0.5 MHz of Fo	0	—	—
at ± 1.0 MHz of Fo	0	See Fig. 1	See Fig. 1
at ± 30.0 MHz of Fo	—	—	See Fig. 1
Maximum Input Power (per channel) **vs. Ambient Temperatures** (see Note 1)			
at -30° to +25°C	250 Watts	250 Watts	250 Watts
at +50°C	165 Watts	165 Watts	165 Watts
at +75°C	85 Watts	85 Watts	85 Watts
at +100°C	0 Watts	0 Watts	0 Watts
Loads (Included)	150 Watts	150 Watts	150 Watts
Maximum VSWR (Ref 50 ohms)	1.25 To 1	1.25 To 1	1.25 To 1

NOTE 1: Assumes no more than 10% of maximum power rating entering isolator from antenna port.

MECHANICAL DATA

Dimensions			
Height x Weight	10½" x 19"	10½" x 19"	10½" x 19"
Depth - In Front Of Panel	17"	17"	17"
- Behind Panel	2⅛"	2⅛"	2⅛"
Connector Terminations	Type N Female	Type N Female	Type N Female
Finish	Gray Enamel	Gray Enamel	Gray Enamel
Shipping Weight	46 Lbs.	46 Lbs.	46 Lbs.

ORDERING INFORMATION

Model WP-9920 Combiner For Tx1 On _____ MHz And Tx2 On _____ MHz
" **WP-9920-A** " " " " _____ " " " " _____ "
" **WP-9921** " " " " _____ " " " " _____ "
" **WP-9921-A** " " " " _____ " " " " _____ "
" **WP-9922** " " " " _____ " " " " _____ "
" **WP-9922-A** " " " " _____ " " " " _____ "

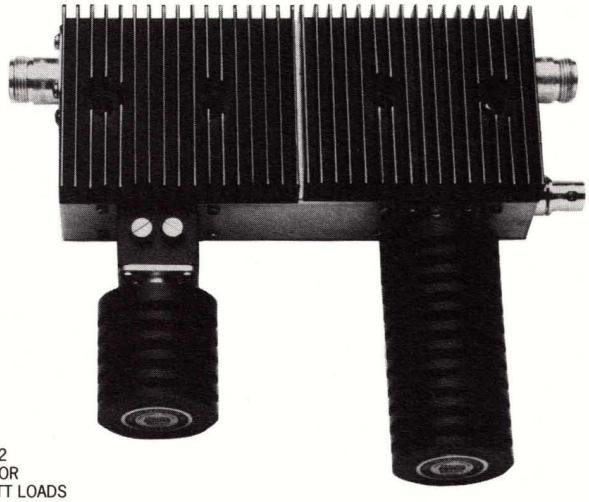
When ordering specify exact frequencies.

800 MHz HIGH POWER ISOLATORS

POWER TO 350 WATTS

WF8X-4XXX
WF8X-6XXX
WF8X-8XXX
SERIES
850-960 MHz

MODEL WF81-4102
150 WATT ISOLATOR
WITH 25 WATT LOAD



MODEL WF81-4212
150 WATT ISOLATOR
WITH 15 & 25 WATT LOADS

Wacom's new line of medium, high and extra high power ferrite isolators provide high performance characteristics not found in other products. These are fixed tuned models that provide greater isolation over a broad bandwidth. The solid compact design of these new models result in improved heat conductivity to the external heat sinks, thus improving power handling capability and frequency stability.

HIGH POWER HANDLING. Three basic models are available for handling maximum transmitter powers of either 150, 250 or 350 watts (continuous duty). Various sizes and types of load terminations are available and it is important that an appropriate load be used.

FREQUENCY BANDS. All models are fixed tuned at the factory for operation on one of four frequency sub-bands. When ordering, specify the exact operating frequency so that the isolator can be adjusted for optimum performance at the specified "center frequency" within one of the following bands:

WF81: 850 to 870 MHz
WF82: 870 to 890 MHz
WF83: 925 to 940 MHz
WF84: 940 to 960 MHz

Models can be supplied for operation on sub-bands other than the above but performance specifications may be somewhat degraded.

SAMPLER PORT is provided on all models. The sampler port consists of a probe positioned in the output-to-dummy load path of the isolator to sample energy being reflected to the load port. (The probe is decoupled from the path by approximately 30 dB). With a suitable detector (spectrum analyzer) attached, the sampler port provides a convenient means for tuning the cavity following the isolator.

FREQUENCY STABILITY of this new line of isolators is excellent. The exceptional stability is a result of several factors: (1) they are fixed tuned devices that do not use tunable capacitors inside the isolator; (2) they are broadband devices; (3) the solid compact design provides superior heat conduction to the external heat sinks so the isolators operate at a cooler temperature.

LOAD TERMINATIONS. A wide assortment is available from Wacom for use on isolators and hybrids. The output load on an isolator must be sized to handle whatever power is reflected to the load port. In practice, the load is generally sized to equal anywhere from ¼ to ½ of the transmitted power feeding the isolator.

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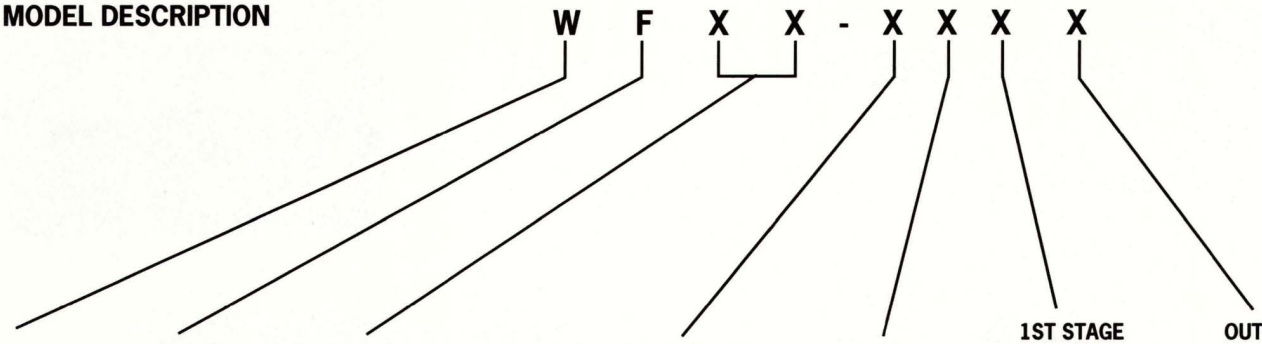
MODEL DESCRIPTION



MFR	PRODUCT	FREQ. BAND	STYLE/POWER	TYPE	1ST STAGE LOAD	OUTPUT LOAD
WACOM	ISOLATOR	81 = 850-870 MHz 82 = 870-890 MHz 83 = 925-940 MHz 84 = 940-960 MHz	4 = FIXED TUNED 150 WATTS 6 = FIXED TUNED 250 WATTS 8 = FIXED TUNED 350 WATTS	1 = SINGLE 2 = DUAL	0 = NO LOAD 1 = 15 WATTS 2 = 25 WATTS 3 = 60 WATTS 4 = 100 WATTS 5 = 150 WATTS 6 = 200 WATTS 7 = 250 WATTS	0 = NO LOAD 1 = 15 WATTS 2 = 25 WATTS 3 = 60 WATTS 4 = 100 WATTS 5 = 150 WATTS 6 = 200 WATTS 7 = 250 WATTS

EXAMPLE: WF81-4102 designates a 150 watt rated Single Junction Isolator with 25 watt load, for the 850-870 MHz band.

EXAMPLE: WF82-6213 designates a 250 watt rated Dual Junction Isolator with 15 and 60 watt loads, for the 870-890 MHz band.

SINGLE JUNCTION ISOLATORS

	WF8X-4XXX	WF8X-6XXX	WF8X-8XXX
Frequency Bands	WF81: 850-870 MHz WF82: 870-890 MHz WF83: 925-940 MHz WF84: 940-960 MHz	WF81: 850-870 MHz WF82: 870-890 MHz WF83: 925-940 MHz WF84: 940-960 MHz	WF81: 850-870 MHz WF82: 870-890 MHz WF83: 925-940 MHz WF84: 940-960 MHz
Fixed Bandwidth (Passband)	SAME AS ABOVE	SAME AS ABOVE	SAME AS ABOVE
Insertion Loss Across Passband	0.25 dB	0.25 dB	0.25 dB
Reverse Direction Isolation (Note 1)			
At Center Frequency	35 dB	35 dB	35 dB
At ±10 MHz of Center Frequency	30 dB	30 dB	30 dB
VSWR (Ref. 50 ohms)	1.25 to 1	1.25 to 1	1.25 to 1
Maximum Input Power vs Ambient Temperatures (See Note 2)			
At -30°C to +25°C	150 Watts	250 Watts	350 Watts
At +50°C	100 Watts	165 Watts	230 Watts
At +75°C	50 Watts	85 Watts	115 Watts
At +100°C	0 Watts	0 Watts	0 Watts
Loads (included)	Note 3	Note 3	Note 3
Dimensions (excluding load) **Inches**	3⅞ x 4 x 1⅝	3⅞ x 4 x 2	3⅞ x 4 x 2¾

DUAL JUNCTION ISOLATORS

	WF8X-4XXX	WF8X-6XXX	WF8X-8XXX
Frequency Bands	WF81: 850-870 MHz WF82: 870-890 MHz WF83: 925-940 MHz WF84: 940-960 MHz	WF81: 850-870 MHz WF82: 870-890 MHz WF83: 925-940 MHz WF84: 940-960 MHz	WF81: 850-870 MHz WF82: 870-890 MHz WF83: 925-940 MHz WF84: 940-960 MHz
Fixed Bandwidth (Passband)	SAME AS ABOVE	SAME AS ABOVE	SAME AS ABOVE
Insertion Loss Across Passband	0.5 dB	0.5 dB	0.5 dB
Reverse Direction Isolation (Note 1)			
At Center Frequency	70 dB	70 dB	70 dB
At ±10 MHz of Center Frequency	60 dB	60 dB	60 dB
VSWR (Ref. 50 ohms)	1.25 to 1	1.25 to 1	1.25 to 1
Maximum Input Power vs Ambient Temperatures (See Note 2)			
At -30°C to +25°C	150 Watts	250 Watts	350 Watts
At +50°C	100 Watts	165 Watts	230 Watts
At +75°C	50 Watts	85 Watts	115 Watts
At +100°C	0 Watts	0 Watts	0 Watts
Loads (included)	Note 3	Note 3	Note 3
Dimensions (excluding load) **Inches**	3⅞ x 7⅜ x 1⅝	3⅞ x 7⅜ x 2	3⅞ x 7⅜ x 2¾

Note 1: As shipped from the factory, the isolator is adjusted so that "center frequency" is the frequency specified on customer's order. If desired, the center frequency can be changed to any other frequency within the isolator's frequency band by tuning the matching section at the load port.
Note 2: Assumes no more than 10% of maximum power rating entering isolator from antenna port.
Note 3: Isolators can be supplied with 15, 25, 60, 100, 150, 200 and 250 watt loads (continuous duty). The 15 and 25 watt loads are screw-on type.

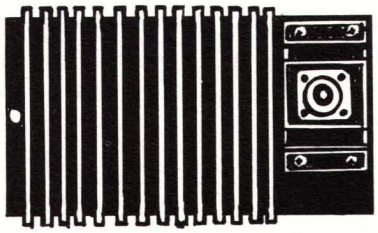
WACOM PRODUCTS

LOAD TERMINATIONS

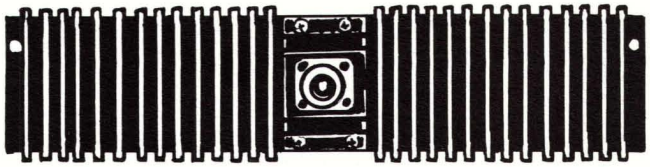
WLT-3000
WLT-5000
SERIES

15 WATT

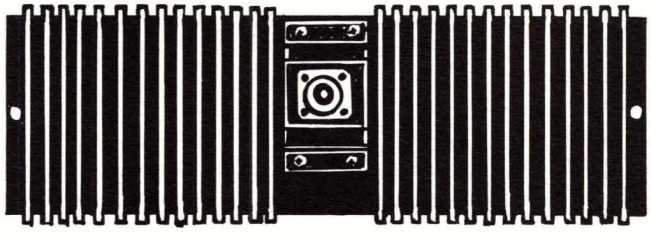
25 WATT



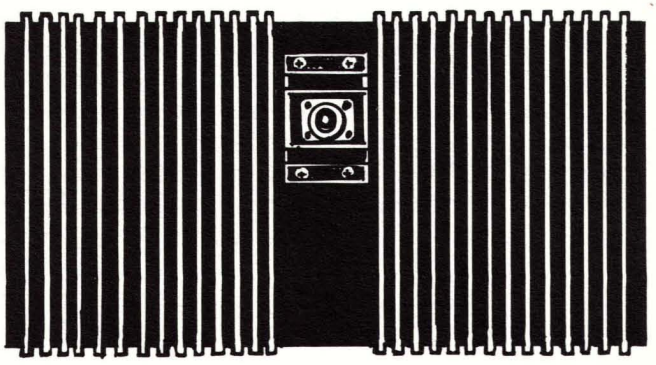
60 WATT



100 WATT



150 WATT



200 WATT

MODEL NUMBER	WLT-3015	WLT-3025	WLT-5060	WLT-5100	WLT-5150	WLT-5200	WLT-5250
FREQUENCY RANGE	DC-1000 MHz						
TYPE	SCREW ON		PANEL MOUNT				
POWER RATING (WATTS)							
CONTINUOUS DUTY	15	25	60	100	150	200	250
20% DUTY (1 ON, 4 OFF)	40	60	—	—	—	—	—
CONNECTOR TYPE	TYPE N MALE		TYPE N FEMALE				
VSWR MAX							
DC-500 MHz	1.15:1		1.20:1				
500-1000 MHz	1.15:1		1.20:1				
SIZE (INCHES)	1½x1½	1½x3	3x2⅜x5	2x2⅜x10	3x2⅜x10	5x2⅜x10	6x2⅜x10

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WACOM PRODUCTS, INC.

ABOUT POWER RATINGS OF LOAD TERMINATIONS:

The power ratings of load terminations used in the Land Mobile Radio Service has historically been influenced by the expected duty cycle or type of service for which the load termination is to be used. The expected duty cycle of a load termination used as a terminating load for an isolator would normally be much lighter than what would be expected if the load were to be used as the termination of a hybrid coupler. For this reason the small screw on loads normally used on isolators have traditionally been rated assuming a light duty cycle.

WACOM PRODUCTS, in an attempt to achieve some standardization of power ratings for load terminations, is using a power rating system of 100% duty (continuous duty) for all loads. In addition, for the small screw on loads used on isolators an intermittent duty rating is also given. The intermittent duty for these terminations is 20% duty (1 minute on, 4 minutes off).

Numerous factors are involved in determining the power handling capability of a load termination, but the two principal factors are: (1) the power rating and maximum allowable surface temperature of the resistor element itself and (2) the ability to remove and dissipate heat from the resistor element. Operation of the resistor element beyond its power or maximum surface temperature limitations could result in changes in the characteristic impedance of the resistor element. Obviously, if the limits of the resistor are greatly exceeded then even catastrophic damage to the resistor element or load assembly is likely.

The manufacturer of the resistor elements used in Wacom Products load terminations specifies a maximum surface temperature of 135 to 155°C (275 to 311°F), depending upon whether the resistor element is a rod element as used on most screw on loads or a flange element as used on larger loads. Wacom Products has complied with these specifications and the maximum power rating specification of the resistor element in the power rating of their load terminations.

The removal and dissipation of heat from the resistor element is accomplished by the use of heat sinking. Basically, the larger the heat sink surface area, the more cooling effect for the resistor assembly. At Wacom Products we have found the maximum allowable temperature of the heat sink on the load termination to be 100°C (212°F). If the heat sink temperature is allowed to increase beyond 100°C then the resistor element surface temperature will be beyond its maximum allowable temperature and adverse changes in the load assembly are likely. Our approach is to rate our load termination assuming the load resistor element and its heat sink to be a complete independent entity without depending upon any other object becoming an additional heat sink. Our ratings are based upon ambient temperature of 25°C (77°F) and the power ratings will be decreased with ambient temperatures above that level.

The disparity of power ratings of screw on loads for isolators becomes evident when a comparison is made of the various ones available from the industry. Obviously, no standardization exists. Certainly, none are rated for 100% duty, no intermittent duty cycle is established and no consistent maximum allowable temperature rise is evident. Until the power rating criteria for a load is known, no direct comparison is possible. The philosophy used by Wacom Products is to rate the screw on load for isolators at 100% duty cycle just the same as the larger, independent loads. We do not believe that the isolator should be used as a supplemental heat sink for the load termination, in fact it is our contention that the isolator would be better served if it did not have to dissipate any of the heat generated by the load resistor. Therefore, our screw on load termination will carry a much lower power rating than other comparable competitive units, but our intermittent duty rating will be found to be more comparable to the rest of the industry.

NEW PRODUCT

FERRITE ISOLATORS

SINGLE

DUAL

SINGLE JUNCTION MODELS

MODEL	WP-9030 SERIES	WP-9070 SERIES	WP-9080 SERIES
Frequency Range, in MHz	148–174	450–512	806–960
Bandwidth, in MHz	5	10	10
Isolation (Center Freq), in dB	30	30	30
Insertion Loss in dB	0.35	0.25	0.20
VSWR (ref 50 ohms)	1.25 to 1	1.25 to 1	1.25 to 1
Maximum Input Power, in Watts	125	125	125
Loads (Included)	Note 1	Note 1	Note 1
Temperature Range, °C	-30 to +60	-30 to +60	-30 to +60
Dimensions (Excluding Loads) (Inches)	3 x 3¾ x 1¼	3 x 3¾ x 1¼	3 x 3¾ x 1¼

NOTE 1: Isolators can be supplied with 30, 60 or 125 watt loads. The 30 and 60 watt Loads are screw-on; the 125 watt load is supplied with mounting bracket. The type of load is designated by a suffix number following the model number, i.e., **WP-9030-3** designates 30 watt load; -6 designates 60 watts and -7 designates 125 Watt load.

DUAL JUNCTION MODELS

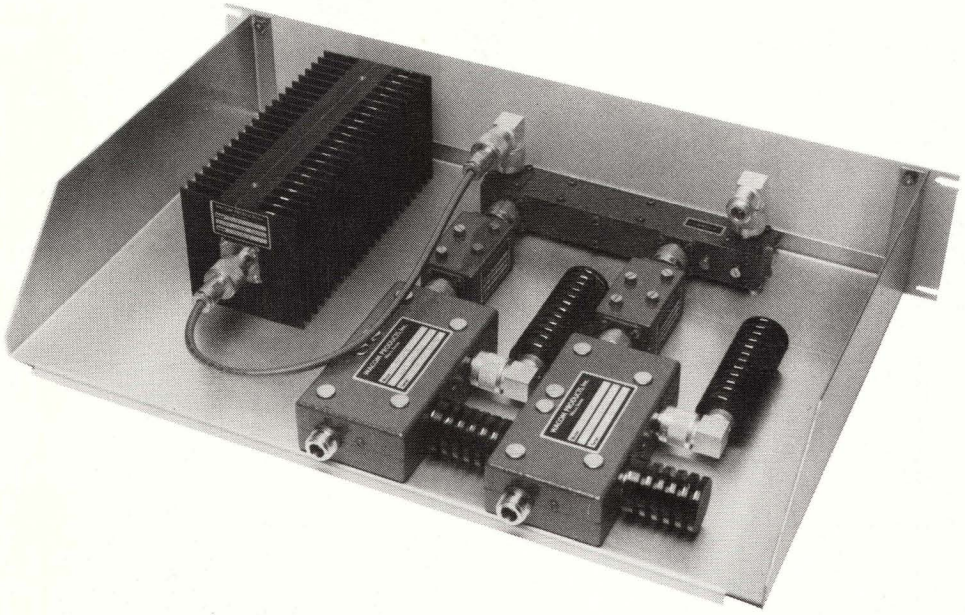
MODEL	WP-9035 SERIES	WP-9075 SERIES	WP-9085 SERIES
Frequency Range, in MHz	148–174	450–512	806–960
Bandwidth, in MHz	5	10	10
Isolation (Center Freq), in dB	70	70	70
Insertion Loss in dB	0.50	0.45	0.35
VSWR (ref 50 ohms)	1.25 to 1	1.25 to 1	1.25 to 1
Maximum Input Power, in Watts	125	125	125
Loads (Included)	Note 1	Note 1	Note 1
Temperature Range, °C	-30 to +60	-30 to +60	-30 to +60
Dimensions (Excluding Loads) (Inches)	3 x 6 x 1¼	3 x 6 x 1¼	3 x 6 x 1¼

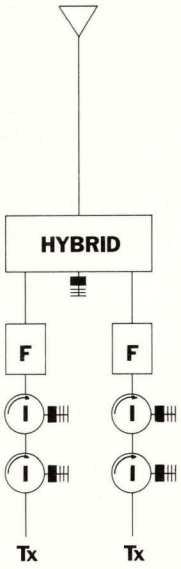
NOTE 1: All dual isolators are supplied with a 30 watt input load. The output load must be designated by adding a suffix number following the model number, i.e., **WP-9035-33** designates 30 and 30 watt loads; -36 designates 30 and 60 watt loads and -37 designates 30 and 125 watt loads.

NEW PRODUCT

HYBRID COUPLER TRANSMITTER COMBINERS

WP-936-2 2-CHANNEL 150–174 MHz
WP-937-2 2-CHANNEL 150–174 MHz
WP-976-2 2-CHANNEL 450–512 MHz
WP-977-2 2-CHANNEL 450–512 MHz
WP-996-2 2-CHANNEL 806–900 MHz
WP-997-2 2-CHANNEL 806–900 MHz





MODEL NUMBER	WP-936-2	WP-937-2	WP-976-2	WP-977-2	WP-996-2	WP-997-2
Frequency Range in MHz	148–174	148–174	406–512	406–512	806–960	806–960
Isolation, Tx–Tx in dB	70	100	70	100	70	100
Ant–Tx in dB	38	73	38	73	38	73
Insertion Loss in dB	3.9	4.2	3.8	4.0	3.8	4.1
Attenuation, har., IM Prod (dB)	65	65	65	65	65	65
Input Power, ea. ch., max. (Watt)	125	125	125	125	125	125
Input VSWR, (Ref. 50 ohms)	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1
Freq. Sep., Tx–Tx, max. in MHz	1	1	1	1	1	1
Temperature Range °C	-30 to +60	-30 to +60	-30 to +60	-30 to +60	-30 to +60	-30 to +60
Connector Type	N-Female	N-Female	N-Female	N-Female	N-Female	N-Female

NEW PRODUCT

RF AMPLIFIERS

MODEL	BASIC TYPE	FREQUENCY RANGE MHz	GAIN NOM dB	NOISE FIGURE MAX	IP3 OUTPUT MIN dBM	NORMAL POWER Volts	NORMAL POWER MA
WQ30-1620	Bi-Polar	30-300	16.0	5.8	35	20	150
WQ70-1610	GaAsFET	450-470	16.0	1.0	20	12	40
WQ70-1810	QuadBiPolar	406-512	18.0	2.8	30	12	80
WQ70-1820	Quad BiPolar	406-512	18.0	2.8	30	20	80
WQ70-2410	Quad 2 Stage	450-470	24.0	1.2	20	12	100
WQ80-1610	Quad BiPolar	806-920	16.0	2.8	30	12	80
WQ80-1620	Quad BiPolar	806-920	16.0	2.8	30	20	80
WQ80-2620	Quad 2-Stage	806-920	26.0	2.8	34	20	275

WACOM PRODUCTS, INC.

NEW PRODUCT

MISCELLANEOUS TRANSMITTER FILTERS

LOW PASS FILTERS

MODEL	WLP-130N	WLP-170N	WLP-180N
Frequency Band	144-174 MHz	440-512 MHz	806-960 MHz
Insertion Loss	0.2 dB	0.2 dB	0.2 dB
Isolation at 2nd & 3rd Harmonic	60 dB	60 dB	60 dB
Maximum Power Input	300 Watts	300 Watts	300 Watts
VSWR (Ref 50 ohms)	1.25 to 1	1.25 to 1	1.25 to 1
Connectors	Type N	Type N	Type N
Dimensions (inches)	$1^{1/4} \times 1^{3/8} \times 4$	$1^{1/4} \times 1^{3/8} \times 4$	$1^{1/4} \times 1^{3/8} \times 4$
Replace Suffix "N" with "U" to designate UHF Type Connectors			

SECOND HARMONIC FILTERS

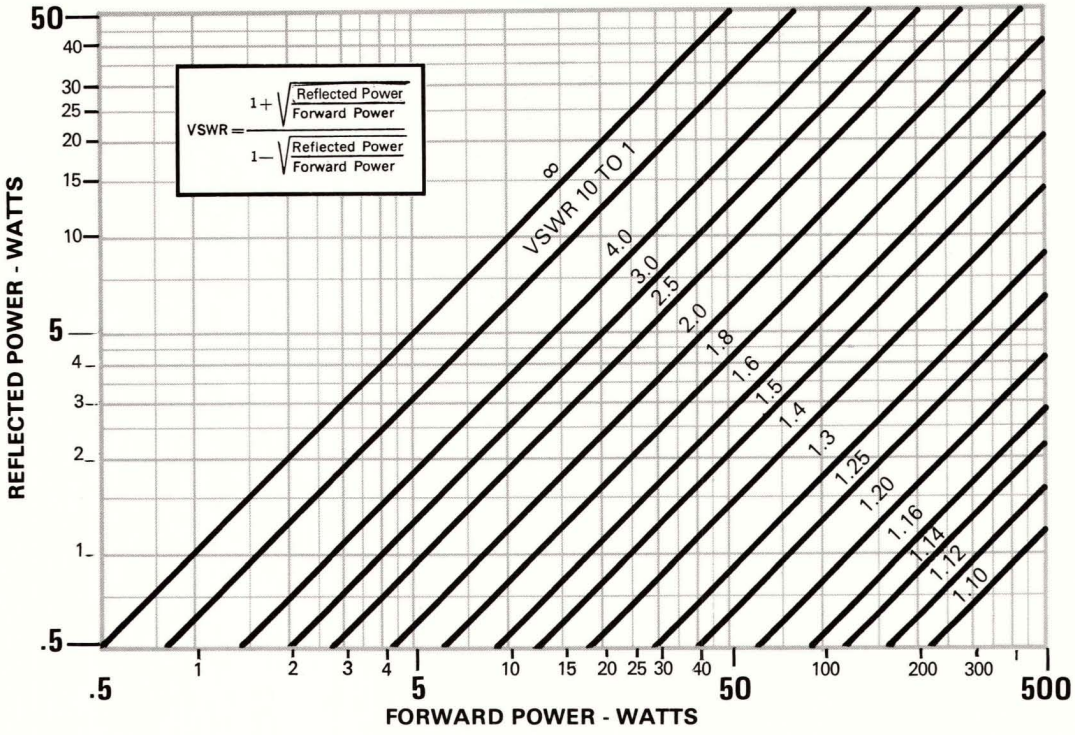
MODEL	WNF-130N	WNF-170N	WNF-180N
Frequency Band	144-174 MHz	440-512 MHz	806-960 MHz
Insertion Loss	0.1 dB	0.1 dB	0.1 dB
Isolation at 2nd & 3rd Harmonic	40 dB	40 dB	40 dB
Maximum Power Input	300 Watts	300 Watts	300 Watts
VSWR (Ref 50 ohms)	1.25 to 1	1.25 to 1	1.25 to 1
Connectors	Type N	Type N	Type N
Dimensions (inches)	$1 \times 1^{1/4} \times 2^{3/4}$	$1 \times 1^{1/4} \times 2^{3/4}$	$1 \times 1^{1/4} \times 2^{3/4}$

IMPEDANCE MATCHER

MODEL	WZM-130N	WZM-170N	WZM-180N
Frequency Band	144-174 MHz	440-512 MHz	806-960 MHz
Insertion Loss	0.1 dB	0.1 dB	0.1 dB
VSWR, Max Allowable Mismatch	2 to 1	2 to 1	2 to 1
Maximum Power Input	300 Watts	300 Watts	300 Watts
Connectors	Type N	Type N	Type N
Dimensions (inches)	$1 \times 1^{1/4} \times 2^{3/4}$	$1 \times 1^{1/4} \times 2^{3/4}$	$1 \times 1^{1/4} \times 2^{3/4}$

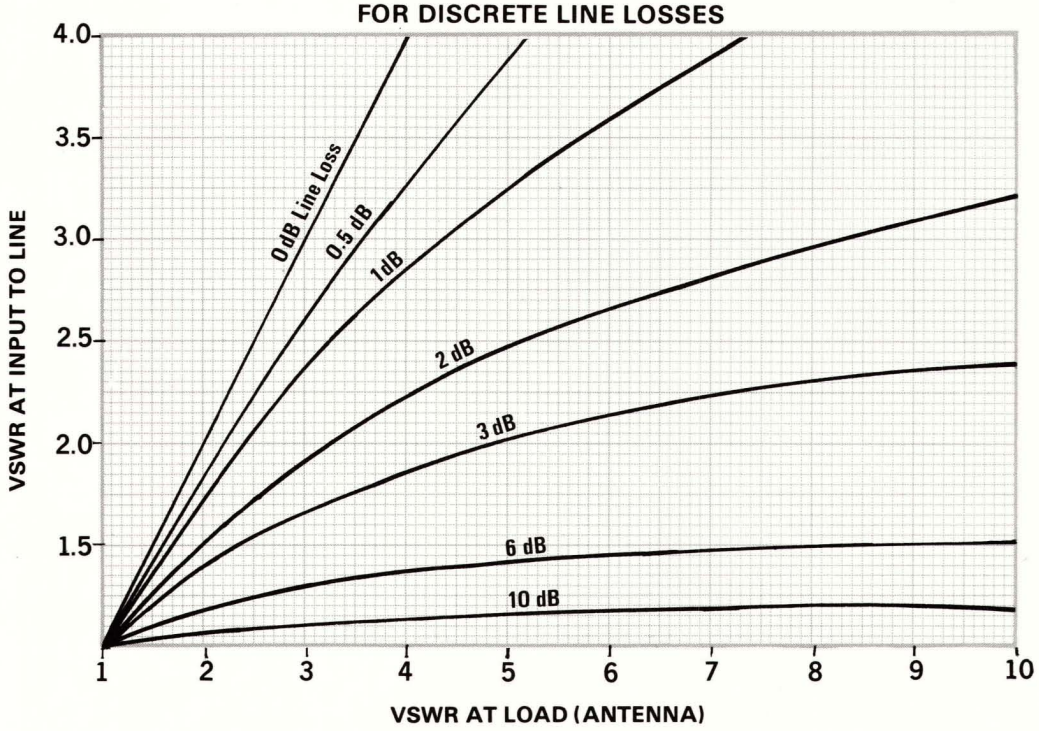
VSWR NOMOGRAPH

POWER VALUES VS VSWR



VSWR CONVERSION CHART

FOR DISCRETE LINE LOSSES



FIELD MEASUREMENT OF VSWR: An inline watt meter will provide acceptable accuracy for measuring VSWR of antenna systems. Typically, a base station antenna system is expected to have a VSWR of 1.5 to 1, or less, measured at the antenna. To determine the VSWR, measure the forward power and reverse power. Use the above VSWR Nomograph to find VSWR. If the VSWR is measured at the antenna terminals, the indicated VSWR is the actual VSWR at the antenna. For example, measurements of 100 watts forward power and 4 watts reflected power represents a VSWR of 1.5 to 1.

If VSWR is measured at the station end of the transmission line, the indicated VSWR will not be the actual VSWR at the antenna because of attenuation in the transmission line. The above VSWR Conversion Chart can be used to determine the actual VSWR at the antenna terminals. For example, assume a length of transmission line which has a loss of 3 dB. If the watt meter at the station end of the line measures 50 watts forward power and 4 watts reflected power, the indicated VSWR is 1.8 to 1. Use of the VSWR Conversion Chart will show that the actual VSWR at the antenna is 3.7 to 1.

WACOM PRODUCTS, INC.

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SHIPPING ADDRESS: 6900 N. HWY. 6 • WACO, TEXAS 76712
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July 1, 1993

PRICE LIST No. 933

BANDPASS CAVITIES

MODEL NUMBER	DESCRIPTION	DIA. OF CAV.	FREQUENCY RANGE — MHz [1]							
			30-54	66-88	118-144	144-174	200-230 300-350	406-440	440-512	806-960
WP-408-1	SINGLE CAVITY w/MTG. BRKTS.	8" OD	510.00							
WP-408-2	DUAL CAVITY w/MTG. BRKTS.	8" OD	1080.00							
WP-408-3	TRIPLE CAVITY w/MTG. BRKTS.	8" OD	1630.00							
WP-409-1	SINGLE CAVITY w/MTG. BRKTS.	10" OD	590.00							
WP-409-2	DUAL CAVITY w/MTG. BRKTS.	10" OD	1240.00							
WP-409-3	TRIPLE CAVITY w/MTG. BRKTS.	10" OD	1870.00							
WP-410-1	SINGLE CAVITY	5" OD		230.00						
WP-410-2	DUAL CAVITY w/MTG. BRKTS.	5" OD		500.00						
WP-410-3	TRIPLE CAVITY w/MTG. BRKTS.	5" OD		790.00						
WP-418-1	SINGLE CAVITY	8" OD		300.00						
WP-418-2	DUAL CAVITY w/MTG. BRKTS.	8" OD		660.00						
WP-419-1	SINGLE CAVITY	10" OD		380.00						
WP-419-2	DUAL CAVITY w/MTG. BRKTS.	10" OD		820.00						
WP-420-1	SINGLE CAVITY	5" OD			165.00					
WP-420-2	DUAL CAVITY w/MTG. BRKTS.	5" OD			370.00					
WP-420-3	TRIPLE CAVITY w/MTG. BRKTS.	5" OD			560.00					
WP-428-1	SINGLE CAVITY	8" OD			200.00					
WP-428-2	DUAL CAVITY w/MTG. BRKTS.	8" OD			460.00					
WP-429-1	SINGLE CAVITY	10" OD			260.00					
WP-429-2	DUAL CAVITY w/MTG. BRKTS.	10" OD			580.00					
WP-430-1	SINGLE CAVITY	5" OD				165.00				
WP-430-2	DUAL CAVITY w/MTG. BRKTS.	5" OD				370.00				
WP-430-3	TRIPLE CAVITY w/MTG. BRKTS.	5" OD				560.00				
WP-438-1	SINGLE CAVITY	8" OD				200.00				
WP-438-2	DUAL CAVITY w/MTG. BRKTS.	8" OD				460.00				
WP-438-3	TRIPLE CAVITY w/MTG. BRKTS.	8" OD				700.00				
WP-439-1	SINGLE CAVITY	10" OD				260.00				
WP-439-2	DUAL CAVITY w/MTG. BRKTS.	10" OD				580.00				
WP-439-3	TRIPLE CAVITY w/MTG. BRKTS.	10" OD				880.00				
WP-440-1	SINGLE CAVITY	5" OD					155.00			
WP-440-2	DUAL CAVITY w/MTG. BRKTS.	5" OD					350.00			
WP-440-3	TRIPLE CAVITY w/MTG. BRKTS.	5" OD					530.00			
WP-448-1	SINGLE CAVITY	8" OD					190.00			
WP-448-2	DUAL CAVITY w/MTG. BRKTS.	8" OD					440.00			
WP-449-1	SINGLE CAVITY	10" OD					230.00			
WP-449-2	DUAL CAVITY w/MTG. BRKTS.	10" OD					520.00			
WP-450-1	SINGLE CAVITY	5" OD					155.00			
WP-450-2	DUAL CAVITY w/MTG. BRKTS.	5" OD					355.00			
WP-450-3	TRIPLE CAVITY w/MTG. BRKTS.	5" OD					530.00			
WP-458-1	SINGLE CAVITY	8" OD					190.00			
WP-458-2	DUAL CAVITY w/MTG. BRKTS.	8" OD					440.00			
WP-459-1	SINGLE CAVITY	10" OD					230.00			
WP-459-2	DUAL CAVITY w/MTG. BRKTS.	10" OD					520.00			
WP-460-1	SINGLE CAVITY	5" OD						140.00		
WP-460-2	DUAL CAVITY w/MTG. BRKTS.	5" OD						325.00		
WP-460-3	TRIPLE CAVITY w/MTG. BRKTS.	5" OD						495.00		
WP-464-1	SINGLE CAVITY	4" OD						150.00		
WP-464-2	DUAL CAVITY MTD. ON PANEL	4" OD						350.00		
WP-464-3	TRIPLE CAVITY MTD. ON PANEL	4" OD						525.00		
WP-468-1	SINGLE CAVITY	8" OD						190.00		
WP-468-2	DUAL CAVITY w/MTG. BRKTS.	8" OD						445.00		
WP-469-1	SINGLE CAVITY	10" OD						220.00		
WP-469-2	DUAL CAVITY w/MTG. BRKTS.	10" OD						505.00		

[1] For pricing purposes only. Does not necessarily indicate tuning range.

(CONTINUED ON NEXT PAGE)

NOTE: All dual and triple cavity models are supplied with mounting brackets and interconnect cables.
NOTE: All cavities are factory tuned to exact frequency if frequency is specified on the order.

BANDPASS CAVITIES (CONTINUED)

MODEL NUMBER	DESCRIPTION	DIA. OF CAV.	FREQUENCY RANGE — MHz [1]							
			30-54	66-88	118-144	144-174	200-230 300-350	406-440	440-512	806-960
WP-470-1	SINGLE CAVITY	5" OD							140.00	
WP-470-2	DUAL CAVITY w/MTG. BRKTS.	5" OD							330.00	
WP-470-3	TRIPLE CAVITY w/MTG. BRKTS.	5" OD							495.00	
WP-474-1	SINGLE CAVITY	4" OD							150.00	
WP-474-2	DUAL CAVITY MTD. ON PANEL	4" OD							350.00	
WP-474-3	TRIPLE CAVITY MTD. ON PANEL	4" OD							525.00	
WP-474-4	QUAD CAVITY MTD. ON PANEL	4" OD							700.00	
WP-478-1	SINGLE CAVITY	8" OD							190.00	
WP-478-2	DUAL CAVITY w/MTG. BRKTS.	8" OD							445.00	
WP-478-3	TRIPLE CAVITY w/MTG. BRKTS.	8" OD							680.00	
WP-479-1	SINGLE CAVITY	10" OD							220.00	
WP-479-2	DUAL CAVITY w/MTG. BRKTS.	10" OD							505.00	
WP-494-1	SINGLE CAVITY	4" OD								150.00
WP-494-2	DUAL CAVITY MTD. ON PANEL	4" OD								350.00
WP-494-3	TRIPLE CAVITY MTD. ON PANEL	4" OD								525.00
WP-497-1	SINGLE CAVITY	7" OD								215.00
WP-497-2	DUAL CAVITY MTD. ON PANEL	7" OD								515.00
WP-498-1	SINGLE CAVITY	8" OD								225.00
WP-498-2	DUAL CAVITY MTD. ON PANEL	8" OD								535.00
WP-498-3	TRIPLE CAVITY MTD. ON PANEL	8" OD								830.00

[1] For pricing purposes only. Does not necessarily indicate tuning range.
NOTE: All dual and triple cavity models are supplied with mounting brackets and interconnect cables.
NOTE: All cavities are factory tuned to exact frequency if frequency is specified on the order.

DUPLEXERS

MODEL NUMBER	DESCRIPTION	TYPE [2]	NO. OF CAV.	MIN. FREQ. Spacing in MHz	FREQUENCY RANGE — MHz [1]							
					30-54	66-88	118-144	144-174	200-230 300-350	406-440	440-512	806-960
WP-604	STATION DUPLEXER	BpBr	4	0.3	2200.00							
WP-609	STATION DUPLEXER	BpBr	4	0.5	1200.00							
WP-612	STATION DUPLEXER	BpBr	4	0.5		1040.00						
WP-621	STATION DUPLEXER	BpBr	4	0.5			960.00					
WP-622	STATION DUPLEXER	BpBr	6	0.3			1440.00					
WP-623	STATION DUPLEXER	BpBr	6	0.5			1440.00					
WP-629	STATION DUPLEXER	BpBr	4	0.6			780.00					
WP-630	STATION DUPLEXER	BpBr	4	2.0				1300.00				
WP-634	STATION DUPLEXER	Bp	4	4.0				780.00				
WP-636	STATION DUPLEXER	Bp	6	3.0				1150.00				
WP-639	STATION DUPLEXER	BpBr	4	0.6				780.00				
WP-641	STATION DUPLEXER	BpBr	4	0.5				960.00				
WP-642	STATION DUPLEXER	BpBr	6	0.3				1440.00				
WP-643	STATION DUPLEXER	BpBr	6	0.5				1440.00				
WP-652	STATION DUPLEXER	BpBr	4	1.0					740.00			
WP-653	STATION DUPLEXER	BpBr	6	1.0					1100.00			
WP-658	STATION DUPLEXER	BpBr	4	1.0					1200.00			
WP-665	STATION DUPLEXER	BpBr	4	3.0						740.00		
WP-671	STATION DUPLEXER	Bp	6	3.0							1110.00	
WP-672	STATION DUPLEXER	BpBr	6	3.0							1110.00	
WP-678	STATION DUPLEXER	BpBr	4	3.0							740.00	
WP-682	STATION DUPLEXER	BpBr	4	10.0								1110.00
WP-686	STATION DUPLEXER	BpBr	2	45.0								390.00
WP-687	STATION DUPLEXER	BpBr	4	25.0								740.00
WP-688	STATION DUPLEXER	BpBr	4	2.7								740.00
WP-691	STATION DUPLEXER	BpBr	4	2.0								1150.00
WP-692	STATION DUPLEXER	BpBr	4	10.0								1150.00
WP-698	STATION DUPLEXER	BpBr	4	12.0	(FOR THE 1.270 TO 1.295 GHz BAND)							740.00

[1] For pricing purposes only. Does not necessarily indicate tuning range.
[2] Terminology: Bp = Bandpass duplexer; Br = Band-reject duplexer; BpBr = BpBr Circuit® duplexer.
NOTE: All duplexers are factory tuned. When ordering, specify exact Tx and Rx frequencies.

BpBr CIRCUIT® FILTERS (U.S. Patent No. 4,080,601)

MODEL NUMBER	DESCRIPTION	DIA. OF CAV.	FREQUENCY RANGE — MHz [1]							
			30-54	66-88	118-144	144-174	200-230 300-350	406-440	440-512	806-960
WP-708-1	SINGLE FILTER w/MTG. BRKTS.	8" OD	510.00							
WP-708-2	DUAL FILTER w/MTG. BRKTS.	8" OD	1080.00							
WP-709-1	SINGLE FILTER w/MTG. BRKTS.	10" OD	590.00							
WP-709-2	DUAL FILTER w/MTG. BRKTS.	10" OD	1240.00							
WP-715-1	SINGLE FILTER	5" OD		230.00						
WP-715-2	DUAL FILTER w/MTG. BRKTS.	5" OD		500.00						
WP-718-1	SINGLE FILTER	8" OD		300.00						
WP-718-2	DUAL FILTER w/MTG. BRKTS.	8" OD		660.00						
WP-719-1	SINGLE FILTER	10" OD		380.00						
WP-719-2	DUAL FILTER w/MTG. BRKTS.	10" OD		820.00						
WP-725-1	SINGLE FILTER	5" OD			165.00					
WP-725-2	DUAL FILTER w/MTG. BRKTS.	5" OD			370.00					
WP-728-1	SINGLE FILTER	8" OD			200.00					
WP-728-2	DUAL FILTER w/MTG. BRKTS.	8" OD			460.00					
WP-729-1	SINGLE FILTER	10" OD			260.00					
WP-729-2	DUAL FILTER w/MTG. BRKTS.	10" OD			580.00					
WP-735-1	SINGLE FILTER	5" OD				165.00				
WP-735-2	DUAL FILTER w/MTG. BRKTS.	5" OD				370.00				
WP-735-3	TRIPLE FILTER w/MTG. BRKTS.	5" OD				560.00				
WP-738-1	SINGLE FILTER	8" OD				200.00				
WP-738-2	DUAL FILTER w/MTG. BRKTS.	8" OD				460.00				
WP-738-3	TRIPLE FILTER w/MTG. BRKTS.	8" OD				700.00				
WP-739-1	SINGLE FILTER	10" OD				260.00				
WP-739-2	DUAL FILTER w/MTG. BRKTS.	10" OD				580.00				
WP-739-3	TRIPLE FILTER w/MTG. BRKTS.	10" OD				880.00				
WP-745-1	SINGLE FILTER	5" OD					155.00			
WP-745-2	DUAL FILTER w/MTG. BRKTS.	5" OD					350.00			
WP-748-1	SINGLE FILTER	8" OD					190.00			
WP-748-2	DUAL FILTER w/MTG. BRKTS.	8" OD					440.00			
WP-749-1	SINGLE FILTER	10" OD					230.00			
WP-749-2	DUAL FILTER w/MTG. BRKTS.	10" OD					520.00			
WP-754-1	SINGLE FILTER	4" OD					175.00			
WP-754-2	DUAL FILTER MTD. ON PANEL	4" OD					400.00			
WP-758-1	SINGLE FILTER	8" OD					190.00			
WP-758-2	DUAL FILTER w/MTG. BRKTS.	8" OD					440.00			
WP-759-1	SINGLE FILTER	10" OD					230.00			
WP-759-2	DUAL FILTER w/MTG. BRKTS.	10" OD					520.00			
WP-764-1	SINGLE FILTER	4" OD						150.00		
WP-764-2	DUAL FILTER MTD. ON PANEL	4" OD						350.00		
WP-768-1	SINGLE FILTER	8" OD						190.00		
WP-768-2	DUAL FILTER w/MTG. BRKTS.	8" OD						445.00		
WP-769-1	SINGLE FILTER	10" OD						220.00		
WP-769-2	DUAL FILTER w/MTG. BRKTS.	10" OD						505.00		
WP-774-1	SINGLE FILTER	4" OD							150.00	
WP-774-2	DUAL FILTER MTD. ON PANEL	4" OD							350.00	
WP-774-3	TRIPLE FILTER MTD. ON PANEL	4" OD							525.00	
WP-778-1	SINGLE FILTER	8" OD							190.00	
WP-778-2	DUAL FILTER w/MTG. BRKTS.	8" OD							445.00	
WP-778-3	TRIPLE FILTER w/MTG. BRKTS.	8" OD							680.00	
WP-779-1	SINGLE FILTER	10" OD							220.00	
WP-779-2	DUAL FILTER w/MTG. BRKTS.	10" OD							505.00	
WP-779-3	TRIPLE FILTER w/MTG. BRKTS.	10" OD							770.00	
WP-794-1	SINGLE FILTER	4" OD								150.00
WP-794-2	DUAL FILTER MTD. ON PANEL	4" OD								350.00
WP-794-3	TRIPLE FILTER MTD. ON PANEL	4" OD								525.00
WP-798-1	SINGLE FILTER	8" OD								225.00
WP-798-2	DUAL FILTER MTD. ON PANEL	8" OD								535.00
WP-798-3	TRIPLE FILTER MTD. ON PANEL	8" OD								830.00

[1] For pricing purposes only. Does not necessarily indicate tuning range.
NOTE: Dual and triple filter models are supplied with mounting brackets and interconnect cables.
NOTE: All filters are factory tuned. When ordering specify exact "pass" and "reject" frequencies.

BpBr Circuit® Trademark of Wacom Products, Inc.

STANDARD NOTCH FILTERS

MODEL NUMBER	DESCRIPTION	DIA. OF CAV.	FREQUENCY RANGE — MHz [1]							
			30-54	66-88	118-144	144-174	200-230 300-350	406-440	440-512	806-960
WP-508-1	SINGLE FILTER w/MTG. BRKTS.	8" OD	510.00							
WP-508-2	DUAL FILTER w/MTG. BRKTS.	8" OD	1080.00							
WP-508-3	TRIPLE FILTER w/MTG. BRKTS.	8" OD	1630.00							
WP-509-1	SINGLE FILTER w/MTG. BRKTS.	10" OD	590.00							
WP-509-2	DUAL FILTER w/MTG. BRKTS.	10" OD	1240.00							
WP-509-3	TRIPLE FILTER w/MTG. BRKTS.	10" OD	1870.00							
WP-515-1	SINGLE FILTER	5" OD		230.00						
WP-515-2	DUAL FILTER w/MTG. BRKTS.	5" OD		500.00						
WP-518-1	SINGLE FILTER	8" OD		300.00						
WP-518-2	DUAL FILTER w/MTG. BRKTS.	8" OD		660.00						
WP-519-1	SINGLE FILTER	10" OD		380.00						
WP-519-2	DUAL FILTER w/MTG. BRKTS.	10" OD		820.00						
WP-525-1	SINGLE FILTER	5" OD			165.00					
WP-525-2	DUAL FILTER w/MTG. BRKTS.	5" OD			370.00					
WP-528-1	SINGLE FILTER	8" OD			200.00					
WP-528-2	DUAL FILTER w/MTG. BRKTS.	8" OD			460.00					
WP-529-1	SINGLE FILTER	10" OD			260.00					
WP-529-2	DUAL FILTER w/MTG. BRKTS.	10" OD			580.00					
WP-535-1	SINGLE FILTER	5" OD				165.00				
WP-535-2	DUAL FILTER w/MTG. BRKTS.	5" OD				370.00				
WP-535-3	TRIPLE FILTER w/MTG. BRKTS.	5" OD				560.00				
WP-538-1	SINGLE FILTER	8" OD				200.00				
WP-538-2	DUAL FILTER w/MTG. BRKTS.	8" OD				460.00				
WP-539-1	SINGLE FILTER	10" OD				260.00				
WP-539-2	DUAL FILTER w/MTG. BRKTS.	10" OD				580.00				
WP-545-1	SINGLE FILTER	5" OD					155.00			
WP-545-2	DUAL FILTER w/MTG. BRKTS.	5" OD					350.00			
WP-548-1	SINGLE FILTER	8" OD					190.00			
WP-548-2	DUAL FILTER w/MTG. BRKTS.	8" OD					440.00			
WP-549-1	SINGLE FILTER	10" OD					230.00			
WP-549-2	DUAL FILTER w/MTG. BRKTS.	10" OD					520.00			
WP-555-1	SINGLE FILTER	5" OD					155.00			
WP-555-2	DUAL FILTER w/MTG. BRKTS.	5" OD					355.00			
WP-558-1	SINGLE FILTER	8" OD					190.00			
WP-558-2	DUAL FILTER w/MTG. BRKTS.	8" OD					440.00			
WP-559-1	SINGLE FILTER	10" OD					230.00			
WP-559-2	DUAL FILTER w/MTG. BRKTS.	10" OD					520.00			
WP-565-1	SINGLE FILTER	5" OD						140.00		
WP-565-2	DUAL FILTER w/MTG. BRKTS.	5" OD						325.00		
WP-568-1	SINGLE FILTER	8" OD						190.00		
WP-568-2	DUAL FILTER w/MTG. BRKTS.	8" OD						445.00		
WP-569-1	SINGLE FILTER	10" OD						220.00		
WP-569-2	DUAL FILTER w/MTG. BRKTS.	10" OD						505.00		
WP-574-1	SINGLE FILTER	4" OD							150.00	
WP-574-2	DUAL FILTER MTD. ON PANEL	4" OD							350.00	
WP-574-3	TRIPLE FILTER MTD. ON PANEL	4" OD							525.00	
WP-575-1	SINGLE FILTER	5" OD							140.00	
WP-575-2	DUAL FILTER w/MTG. BRKTS.	5" OD							330.00	
WP-575-3	TRIPLE FILTER w/MTG. BRKTS.	5" OD							495.00	
WP-578-1	SINGLE FILTER	8" OD							190.00	
WP-578-2	DUAL FILTER w/MTG. BRKTS.	8" OD							445.00	
WP-579-1	SINGLE FILTER	10" OD							220.00	
WP-579-2	DUAL FILTER w/MTG. BRKTS.	10" OD							505.00	
WP-594-1	SINGLE FILTER	4" OD								150.00
WP-594-2	DUAL FILTER MTD. ON PANEL	4" OD								350.00
WP-594-3	TRIPLE FILTER MTD. ON PANEL	4" OD								525.00
WP-598-1	SINGLE FILTER	8" OD								225.00
WP-598-2	DUAL FILTER MTD. ON PANEL	8" OD								535.00
WP-598-3	TRIPLE FILTER MTD. ON PANEL	8" OD								830.00

[1] For pricing purposes only. Does not necessarily indicate tuning range.
NOTE: Dual and triple filter models are supplied with mounting brackets and interconnect cables.
NOTE: All notch filters are factory tuned to exact frequency. When ordering specify exact "pass" and "reject" frequencies.

MOUNTING BRACKET ASSEMBLIES FOR CAVITIES

MODEL	DESCRIPTION OF CABLE & CONNECTOR ASSEMBLY	UNIT	PRICE
WP-PS04-4	STEEL PANEL FOR MOUNTING ONE TO FOUR 4" OD CAVITIES (5¼" x 19")	Ea.	24.00
WP-PS04-8	" " " " UP TO EIGHT 4" OD " (8¾" x 19")	"	48.00
WP-PA08-2	ALUMINUM PANEL FOR MOUNTING TWO 8" OD CAVITIES (8¾" x 19")	Ea.	48.00
WP-PA08-4	" " " " UP TO FOUR 8" OD CAVITIES (17½" x 19")	"	80.00
WP-MB05-1	MOUNTING BRACKET ASSEMBLY FOR MOUNTING ONE 5" OD CAVITY	Set of 2	10.00
WP-MB05-2	" " " " " TWO " " "	"	20.00
WP-MB05-3	" " " " " THREE " " "	"	24.00
WP-MB05-4	" " " " " FOUR " " "	"	24.00
WP-MB05-6	" " " " " SIX " " "	"	24.00
WP-MB08-1	MOUNTING BRACKET ASSEMBLY FOR MOUNTING ONE 8" OD CAVITY	Set of 2	20.00
WP-MB08-2	" " " " " TWO " " "	"	40.00
WP-MB08-3	" " " " " THREE " " "	"	60.00
WP-MB08-4	" " " " " FOUR " " "	"	80.00
WP-MB08-6	" " " " " SIX " " "	"	120.00
WP-MB10-1	MOUNTING BRACKET ASSEMBLY FOR MOUNTING ONE 10" OD CAVITY	Set of 2	20.00
WP-MB10-2	" " " " " TWO " " "	"	40.00
WP-MB10-3	" " " " " THREE " " "	"	60.00
WP-MB10-4	" " " " " FOUR " " "	"	80.00
WP-MB10-6	" " " " " SIX " " "	"	120.00

COAXIAL CABLE, CONNECTORS AND CABLE KITS

WACOM PART NO.	MILITARY NO.	DESCRIPTION	PRICE (See Note)
30010	PL-259	CONNECTOR, UHF MALE TEFLON INSULATOR, FOR RG-8, RG-214	$3.00
30011	UG-175	REDUCING ADAPTOR FOR USE WITH PL-259 AND RG-58, RG-142 OR RG-223	.40
30012	PL-258	COUPLING, UHF FEMALE	3.40
30013	M-358	CONNECTOR, UHF TEE, FEMALE-MALE-FEMALE	8.00
30030	UG-1185	CONNECTOR, TYPE N MALE FOR RG-8, RG-214	7.20
30031	UG-1186	CONNECTOR, TYPE N FEMALE FOR RG-8, RG-214	7.20
30032	UG-29	COUPLING, TYPE N FEMALE	8.00
30033	UG-536	CONNECTOR, TYPE N MALE, FOR RG-58, RG-142, RG-223	5.20
30034	UG-107	CONNECTOR, TYPE N TEE, FEMALE-MALE-FEMALE	16.00
30035	UG-28	CONNECTOR, TYPE N TEE, FEMALE-FEMALE-FEMALE	16.00
30036	UG-27	CONNECTOR, TYPE N, RIGHT ANGLE	14.00
30050	UG-88	CONNECTOR, BNC, MALE FOR RG-58, RG-142, RG-223	3.00
30070	UG-146	ADAPTOR CONNECTOR, TYPE N MALE ONE END, UHF FEMALE OTHER END	11.00
30071	UG-83	ADAPTOR CONNECTOR, TYPE N FEMALE ONE END, UHF MALE OTHER END	12.00
30142	RG-142	DOUBLE SHIELDED RG-142 COAXIAL CABLE, 50 OHMS, TEFLON DIELECTRIC. Per Foot	2.60
30214	RG-214	DOUBLE SHIELDED RG-214 (MODIFIED) COAXIAL CABLE, 50 OHMS. Per Foot	2.00
30223	RG-223	DOUBLE SHIELDED RG-223 COAXIAL CABLE, 50 OHMS. Per Foot	.80
30087	—	OPTIONAL DUPLEXER INSTALLATION CABLE KIT, INCLUDING ONE 10' LENGTH OF RG-142 CABLE AND FOUR UHF MALE CONNECTORS (NOT ATTACHED)	36.00
30088	—	OPTIONAL DUPLEXER INSTALLATION CABLE KIT, INCLUDING ONE 10' LENGTH OF RG-142 CABLE AND FOUR TYPE N MALE CONNECTORS (NOT ATTACHED)	52.00
30089	—	OPTIONAL DUPLEXER INSTALLATION CABLE KIT, INCLUDING ONE 10' LENGTH OF RG-142 CABLE AND TWO TYPE N MALE AND TWO UHF MALE CONNECTORS (NOT ATTACHED)	44.00
30090	—	OPTIONAL DUPLEXER INSTALLATION CABLE KIT, INCLUDING ONE 10' LENGTH OF RG-214 (MODIFIED) CABLE AND FOUR UHF MALE CONNECTORS (NOT ATTACHED)	30.00
30091	—	OPTIONAL DUPLEXER INSTALLATION CABLE KIT, INCLUDING ONE 10' LENGTH OF RG-214 (MODIFIED) CABLE AND FOUR TYPE N MALE CONNECTORS (NOT ATTACHED)	46.00
30092	—	OPTIONAL DUPLEXER INSTALLATION CABLE KIT, INCLUDING ONE 10' LENGTH OF RG-214 (MODIFIED) CABLE PLUS TWO TYPE N MALE AND TWO UHF MALE CONNECTORS (NOT ATTACHED)	36.00

NOTE: There is a $10.00 minimum billing on connectors. Connectors may be mixed or matched but the total must equal $10.00 or more.

COAXIAL CABLE ASSEMBLIES

PART NO.	DESCRIPTION OF CABLE & CONNECTOR ASSEMBLY	PRICE vs. LENGTH			
		0 TO 24"	25" TO 48"	49" TO 84"	85" TO 120"
COMPLETE THE PART NUMBER OF THE CABLE ASSEMBLY BY ADDING THE LENGTH OF CABLE (IN INCHES) TO THE PART NUMBER. THE LENGTH SHOULD BE THE TIP TO TIP LENGTH OF THE CENTER CONDUCTOR. AS AN EXAMPLE, PART NO. 30142-UM-UM-22¼ SPECIFIES THE TIP TO TIP LENGTH SHOULD BE 22¼ INCHES.					
30142-UM-UM-XX	RG-142 CABLE WITH ATTACHED UHF MALE & UHF MALE	$21.00	$26.00	$34.00	$41.00
30142-UM-NM-XX	" " " " UHF MALE & N MALE	23.00	28.00	36.00	43.00
30142-UM-BM-XX	" " " " UHF MALE & BNC MALE	20.00	25.00	33.00	40.00
30142-UM-PM-XX	" " " " UHF MALE & PHONO PLUG MALE	20.00	25.00	33.00	40.00
30142-NM-NM-XX	" " " " N MALE & N MALE	24.00	29.00	37.00	44.00
30142-NM-NF-XX	" " " " N MALE & N FEMALE	36.00	41.00	49.00	56.00
30142-NM-BM-XX	" " " " N MALE & BNC MALE	22.00	27.00	35.00	42.00
30142-NM - PM-XX	" " " " N MALE & PHONO PLUG MALE	22.00	27.00	35.00	42.00
30142-BM-BM-XX	" " " " BNC MALE & BNC MALE	20.00	25.00	33.00	40.00
30142-BM-PM-XX	" " " " BNC MALE & PHONO PLUG MALE	20.00	25.00	33.00	40.00
30214-UM-UM-XX	RG-214 CABLE WITH ATTACHED UHF MALE & UHF MALE	20.00	24.00	30.00	36.00
30214-UM-NM-XX	" " " " UHF MALE & N MALE	22.00	26.00	32.00	38.00
30214-NM-NM-XX	" " " " N MALE & N MALE	25.00	29.00	35.00	40.00
30214-NM-NF-XX	" " " " N MALE & N FEMALE	25.00	29.00	35.00	40.00
30214-BM-NM-XX	" " " " BNC MALE & N MALE	28.00	32.00	38.00	44.00
30223-UM-UM-XX	RG-223 CABLE WITH ATTACHED UHF MALE & UHF MALE	17.00	19.00	25.00	30.00
30223-UM-NM-XX	" " " " UHF MALE & N MALE	19.00	21.00	27.00	32.00
30223-UM-BM-XX	" " " " UHF MALE & BNC MALE	17.00	19.00	25.00	30.00
30223-UM-PM-XX	" " " " UHF MALE & PHONO PLUG MALE	17.00	19.00	25.00	30.00
30223-NM-NM-XX	" " " " N MALE & N MALE	21.00	23.00	29.00	34.00
30223-NM-NF-XX	" " " " N MALE & N FEMALE	33.00	35.00	43.00	48.00
30223-NM-BM-XX	" " " " N MALE & BNC MALE	19.00	21.00	27.00	32.00
30223-NM-PM-XX	" " " " N MALE & PHONO PLUG MALE	19.00	21.00	27.00	32.00
30223-BM-BM-XX	" " " " BNC MALE & BNC MALE	17.00	19.00	25.00	30.00
30223-BM-PM-XX	" " " " BNC MALE & PHONO PLUG MALE	17.00	19.00	25.00	30.00

NOTE: The center conductor and both braids of above RG-214 cable are tinned copper.

OPTIONAL CABINETS, RACKS & WEATHERPROOF ENCLOSURES

MODEL	OLD MODEL NUMBER	DESCRIPTION	PRICE
IC-224118	WP-204 & 5	41" INDOOR CABINET WITH DOOR & FRONT PANEL, 41" x 22½" x 18½" (HWD)	450.00
IC-226518	WP-206	65" " " " " " " " 65" x 22½" x 18½" (HWD)	570.00
IC-227418	—	74" " " " " " " " 74" x 22½" x 18½" (HWD)	700.00
IC-228118	WP-208	81" " " " " " " " 81" x 22½" x 18½" (HWD)	780.00
IC-278118	—	81" " " " " " " " 81" x 27" x 18½" (HWD)	840.00
RR-19x75	—	RELAY RACK FOR MOUNTING 19" PANELS (NOT INCLUDED) 75" HEIGHT	420.00
RR-19x82	—	RELAY RACK " " " " " " 82" HEIGHT	450.00
RR-24x75	—	RELAY RACK " " 24" PANELS " " 75" HEIGHT	480.00
RR-24x82	—	RELAY RACK " " " " " " 82" HEIGHT	520.00
OC-214220	WP-230	42" OUTDOOR (NEMA 4) WEATHER-RESISTANT CABINET 42" x 21" x 20"	750.00
OC-201110	—	STAINLESS STEEL WEATHER-RESISTANT (NEMA 4) CABINET, 20½" x 11½" x 10"	700.00

RECEIVER TOWER-TOP AMPLIFIER SYSTEMS

MODEL	DESCRIPTION	PRICE
WP-8670-A	TOWER-TOP RECEIVER AMPLIFIER SYSTEM FOR 450 MHz BAND. INCLUDES TWO 6-CAVITY PRESELECTOR FILTERS TO PASS TWO 4 MHz "WINDOWS" IN THE 450-470 MHz BAND, HIGH GAIN PREAMPLIFIER, PREAMPLIFIER BY-PASS SWITCH, IMPULSE SUPPRESSION UNIT, ALL MOUNTED IN WEATHERPROOF HOUSING FOR MOUNTING NEAR TOP OF TOWER. ALSO INCLUDES BOTTOM-OF-TOWER CONTROL UNIT WITH DC POWER SUPPLY, IMPULSE SUPPRESSION UNIT, 8-CHANNEL Rx POWER DIVIDER SYSTEM ALL MOUNTED ON PANEL FOR 19" RACK MOUNTING.	4440.00
WP-8670-B	SAME AS WP-8670-A, BUT ALSO INCLUDES CROSSBAND COUPLER FOR COMBINING 450-512 MHz ANTENNA AND 806-960 MHz ANTENNA INTO ONE TRANSMISSION LINE. ALSO INCLUDES CROSSBAND COUPLER FOR BOTTOM-OF-TOWER CONTROL UNIT.	5060.00
WP-8690-A	TOWER-TOP RECEIVER AMPLIFIER SYSTEM FOR 800 MHz BAND. INCLUDES A 6-CAVITY PRESELECTOR FILTER TO PASS A 15 MHz "WINDOW" IN THE 806-821 MHz BAND, HIGH GAIN PREAMPLIFIER, PREAMPLIFIER BY-PASS SWITCH, IMPULSE SUPPRESSION UNIT, ALL MOUNTED IN WEATHERPROOF HOUSING FOR MOUNTING NEAR TOP OF TOWER. ALSO INCLUDES BOTTOM-OF-TOWER CONTROL UNIT WITH DC POWER SUPPLY, IMPULSE SUPPRESSION UNIT, 8-CHANNEL Rx POWER DIVIDER SYSTEM, ALL MOUNTED ON PANEL FOR 19" RACK MOUNTING.	3740.00
WP-8690-B	SAME AS WP-8690-A, BUT ALSO INCLUDES CROSSBAND COUPLER FOR COMBINING A 450-512 MHz ANTENNA AND 806-960 MHz ANTENNA INTO ONE TRANSMISSION LINE. ALSO INCLUDES CROSSBAND COUPLER FOR BOTTOM-OF-TOWER CONTROL UNIT.	4360.00
WP-8697-A	TOWER-TOP RECEIVER AMPLIFIER SYSTEM FOR 450 AND 800 MHz BANDS. INCLUDES ALL REQUIRED ITEMS LISTED FOR WP-8670-A AND WP-8690-A PLUS UPPER AND LOWER CROSSBAND COUPLERS.	7140.00

MISCELLANEOUS RX MULTI-COUPLER COMPONENTS

MODEL	DESCRIPTION	CONNECTOR TYPE	PRICE
WQ30-1620	PREAMPLIFIER, 30-400 MHz, 16 dB GAIN, 5.8 dB NF, 20 VDC, BIPOLAR	BNC	365.00
WQ70-1610	PREAMPLIFIER, 450-470 MHz, 16 dB GAIN, 1.0 dB NF, 12 VDC, GaAs FET	BNC	435.00
WQ70-1810	" 406-512 " 18 dB " 2.8 dB " 12 " QUAD BIPOLAR	"	365.00
WQ70-1820	" 406-512 " 18 dB " 2.8 dB " 20 " QUAD BIPOLAR	"	390.00
WQ70-2410	" 450-470 " 24 dB " 1.2 dB " 12 " QUAD 2-STAGE	"	515.00
WQ80-1610	PREAMPLIFIER, 806-920 MHz, 16 dB GAIN, 2.8 dB NF, 12 VDC, QUAD BIPOLAR	BNC	365.00
WQ80-1620	" 806-920 " 16 dB " 2.8 dB " 20 " QUAD BIPOLAR	"	390.00
WQ80-2620	" 806-920 " 26 dB " 2.8 dB " 20 " QUAD 2-STAGE	"	670.00
WX70-02B	RX POWER DIVIDER, 2-WAY, FOR THE 30 - 512 MHz BAND	BNC	80.00
WX70-02N	" " " 2-WAY, " " " " " "	TYPE N	110.00
WX70-04B	" " " 4-WAY, " " " " " "	BNC	115.00
WX70-04N	" " " 4-WAY, " " " " " "	TYPE N	170.00
WX70-12B	" " " 12-WAY, " " 450 - 470 MHz BAND	BNC	365.00
WX80-02B	RX POWER DIVIDER, 2-WAY, FOR THE 800 - 960 MHz BAND	BNC	80.00
WX80-02N	" " " 2-WAY, " " " " " "	TYPE N	110.00
WX80-04B	" " " 4-WAY, " " " " " "	BNC	115.00
WX80-04N	" " " 4-WAY, " " " " " "	TYPE N	170.00
WX80-12B	" " " 12-WAY, " " 806 - 900 MHz BAND	BNC	420.00
WPS-12x200	POWER SUPPLY FOR PREAMPLIFIERS, 120 VAC INPUT, 12 VDC & 200 MA OUTPUT	—	250.00
WPS-12x400	" " " " " " " 12 VDC & 400 MA OUTPUT	—	270.00
WPS-20x200	" " " " " " " 20 VDC & 200 MA OUTPUT	—	250.00
WPS-20x400	" " " " " " " 20 VDC & 400 MA OUTPUT	—	300.00
WLT-001B	¼ WATT LOAD TERMINATION (SCREW-ON) FOR USE WITH RX COUPLER	BNC	10.00
WLT-001N	" " " " " " " " " " "	TYPE N	12.00

RECEIVER PRESELECTOR FILTERS - 150 MHz

MODEL	DESCRIPTION	FREQ. BAND	PASSBAND BANDWIDTH	NO. OF RESONATORS	PRICE
RECEIVER PRESELECTOR FILTERS FOR THE 148-174 MHz BAND ARE NECESSARILY TREATED AS "SPECIALS". CONTACT FACTORY AND DESCRIBE YOUR REQUIREMENTS.					

RECEIVER MULTICOUPLER SYSTEMS - 150 MHz

MODEL	DESCRIPTION	CONNECTOR TYPE	PRICE
WP-8835-4	RECEIVER MULTICOUPLER, 4-CHANNEL, EXPANDABLE, WITH PRE-AMPLIFIER, 117 VAC POWER SUPPLY. (REQUIRES USE OF PRESELECTOR FILTER)	TYPE N	1075.00
WP-8835-8	SAME AS ABOVE EXCEPT 8-CHANNELS	"	1260.00
WP-8835-12	SAME AS ABOVE EXCEPT 12-CHANNELS	"	1450.00

RECEIVER PRESELECTOR FILTERS - 450 MHz

MODEL	DESCRIPTION	FREQ. BAND	PASSBAND BANDWIDTH	NO. OF RESONATORS	PRICE
WW71-1604	PRESELECTOR FILTER, BANDPASS	450-470 MHz	4.0 MHz	6	450.00
WW71-2604	" " "	" "	Two 4.0 MHz	12	1110.00

RECEIVER MULTICOUPLER SYSTEMS - 450 MHz

MODEL	DESCRIPTION	CONNECTOR TYPE	PRICE
WP-8875-4	RECEIVER MULTICOUPLER, 4-CHANNEL, EXPANDABLE, WITH PRE-AMPLIFIER, 117 VAC POWER SUPPLY. (REQUIRES USE OF PRESELECTOR FILTER)	TYPE N	1075.00
WP-8875-8	SAME AS ABOVE EXCEPT 8-CHANNELS	"	1260.00
WP-8875-12	SAME AS ABOVE EXCEPT 12-CHANNELS	"	1450.00
WP-8875-16	SAME AS ABOVE EXCEPT 16-CHANNELS	"	1640.00
WP-8875-24	SAME AS ABOVE EXCEPT 24-CHANNELS	"	2120.00
WP-8875-32	SAME AS ABOVE EXCEPT 32-CHANNELS	"	2500.00

RECEIVER PRESELECTOR FILTERS - 850 MHz

MODEL	DESCRIPTION	FREQ. BAND	PASSBAND BANDWIDTH	NO. OF RESONATORS	PRICE
WW81-1605	PRESELECTOR FILTER, BANDPASS	806-824 MHz	5.0 MHz	6	450.00
WW81-1610	" " "	" "	10.0 MHz	6	450.00
WW81-1718	" " "	" "	18.0 MHz	7	500.00
WW82-1710	PRESELECTOR FILTER, BANDPASS	824-849 MHz	10.0 MHz	7	500.00
WW85-1505	PRESELECTOR FILTER, BANDPASS	896-901 MHz	5.0 MHz	5	400.00
WW85-1605	" " "	" "	5.0 MHz	6	450.00
WW86-1605	PRESELECTOR FILTER, BANDPASS	935-940 MHz	5.0 MHz	6	450.00

RECEIVER MULTICOUPLER SYSTEMS - 850 MHz

MODEL	DESCRIPTION	CONNECTOR TYPE	PRICE
WP-8890-4	RECEIVER MULTICOUPLER, 4-CHANNEL, EXPANDABLE, WITH PRE-AMPLIFIER, 117 VAC POWER SUPPLY. (REQUIRES USE OF PRESELECTOR FILTER)	TYPE N	1075.00
WP-8890-8	SAME AS ABOVE EXCEPT 8-CHANNELS	"	1260.00
WP-8890-12	SAME AS ABOVE EXCEPT 12-CHANNELS	"	1450.00
WP-8890-16	SAME AS ABOVE EXCEPT 16-CHANNELS	"	1640.00
WP-8890-24	SAME AS ABOVE EXCEPT 24-CHANNELS	"	2120.00
WP-8890-32	SAME AS ABOVE EXCEPT 32-CHANNELS	"	2500.00

ISOLATORS & CIRCULATORS, SINGLE & DUAL, 118-960 MHz

(1) IN MOST INSTANCES, AN ISOLATOR (OR CIRCULATOR) IS NOT BROAD ENOUGH TO COVER THE ENTIRE FREQUENCY BAND THEREFORE SEVERAL DIFFERENT MODELS ARE OFFERED IN ORDER TO COVER THE DIFFERENT FREQUENCY SUB-BANDS. THE FOURTH DIGIT OF THE ISOLATOR MODEL NUMBER IS USED TO INDICATE THE FREQUENCY SUB-BAND OVER WHICH THE ISOLATOR CAN BE ADJUSTED TO OPERATE. WHEN ORDERING, YOU MUST INDICATE THE FREQUENCY SUB-BAND YOU DESIRE BY REPLACING THE ★ IN THE MODEL NUMBER WITH THE APPROPRIATE NUMBER, AS INDICATED BELOW. AS AN EXAMPLE, A MODEL WF3★-1212 SHOULD BE ORDERED AS WF31-1212 FOR THE 150-162 MHz BAND OR WF32-1212 FOR THE 162-174 MHz BAND.

118-129 MHz: WF21	405-425 MHz: WF61	850-870 MHz: WF81
129-140 " : WF22	430-450 " : WF62	870-890 " : WF82
140-152 " : WF23	450-470 " : WF71	925-940 " : WF83
150-162 " : WF31	470-494 " : WF72	940-960 " : WF84
162-174 " : WF32	494-512 " : WF73	
220-230 " : WF41		

WHEN ORDERING AN ISOLATOR OR CIRCULATOR MODEL, SPECIFY EXACT OPERATING FREQUENCY.

MODEL	DESCRIPTION	FREQ. BAND [1]	MAX POWER INPUT (WATTS)	TUNABLE OR FIXED TUNED	ISOLATION (dB)	PRICE
WF2★-1100	SINGLE CIRCULATOR (NO LOAD)	118-152	100	TUNABLE	30	340.00
WF2★-1101	SINGLE ISOLATOR WITH 15 WATT LOAD	"	"	"	"	390.00
WF2★-1102	" " " 25 " "	"	"	"	"	425.00
WF2★-1103	" " " 60 " "	"	"	"	"	470.00
WF2★-1200	DUAL CIRCULATOR (NO LOADS)	"	"	"	70	565.00
WF2★-1211	DUAL ISOLATOR WITH 15 AND 15 WATT LOADS	"	"	"	"	665.00
WF2★-1212	" " " 15 " 25 " "	"	"	"	"	700.00
WF2★-1213	" " " 15 " 60 " "	"	"	"	"	745.00
WF3★-1100	SINGLE CIRCULATOR (NO LOAD)	150-174	125	TUNABLE	30	340.00
WF3★-1101	SINGLE ISOLATOR WITH 15 WATT LOAD	"	"	"	"	390.00
WF3★-1102	" " " 25 " "	"	"	"	"	425.00
WF3★-1103	" " " 60 " "	"	"	"	"	470.00
WF3★-1200	DUAL CIRCULATOR (NO LOADS)	"	"	"	70	565.00
WF3★-1211	DUAL ISOLATOR WITH 15 AND 15 WATT LOADS	"	"	"	"	665.00
WF3★-1212	" " " 15 " 25 " "	"	"	"	"	700.00
WF3★-1213	" " " 15 " 60 " "	"	"	"	"	745.00
WF4★-1100	SINGLE CIRCULATOR (NO LOAD)	225-300	125	TUNABLE	30	330.00
WF4★-1101	SINGLE ISOLATOR WITH 15 WATT LOAD	"	"	"	"	380.00
WF4★-1102	" " " 25 " "	"	"	"	"	415.00
WF4★-1103	" " " 60 " "	"	"	"	"	460.00
WF4★-1200	DUAL CIRCULATOR (NO LOADS)	"	"	"	70	560.00
WF4★-1211	DUAL ISOLATOR WITH 15 AND 15 WATT LOADS	"	"	"	"	660.00
WF4★-1212	" " " 15 " 25 " "	"	"	"	"	695.00
WF4★-1213	" " " 15 " 60 " "	"	"	"	"	740.00
WF6★-1100	SINGLE CIRCULATOR (NO LOAD)	405-450	125	TUNABLE	30	325.00
WF6★-1101	SINGLE ISOLATOR WITH 15 WATT LOAD	"	"	"	"	375.00
WF6★-1102	" " " 25 " "	"	"	"	"	410.00
WF6★-1103	" " " 60 " "	"	"	"	"	455.00
WF6★-1200	DUAL CIRCULATOR (NO LOADS)	"	"	"	70	550.00
WF6★-1211	DUAL ISOLATOR WITH 15 AND 15 WATT LOADS	"	"	"	"	650.00
WF6★-1212	" " " 15 " 25 " "	"	"	"	"	685.00
WF6★-1213	" " " 15 " 60 " "	"	"	"	"	730.00
WF7★-1100	SINGLE CIRCULATOR (NO LOAD)	450-512	125	TUNABLE	30	325.00
WF7★-1101	SINGLE ISOLATOR WITH 15 WATT LOAD	"	"	"	"	375.00
WF7★-1102	" " " 25 " "	"	"	"	"	410.00
WF7★-1103	" " " 60 " "	"	"	"	"	455.00
WF7★-1200	DUAL CIRCULATOR (NO LOADS)	"	"	"	70	550.00
WF7★-1211	DUAL ISOLATOR WITH 15 AND 15 WATT LOADS	"	"	"	"	650.00
WF7★-1212	" " " 15 " 25 " "	"	"	"	"	685.00
WF7★-1213	" " " 15 " 60 " "	"	"	"	"	730.00

ISOLATORS & CIRCULATORS (CONTINUED)

MODEL	DESCRIPTION	FREQ. BAND [1]	MAX POWER INPUT (WATTS)	TUNABLE OR FIXED TUNED	ISOLATION (dB)	PRICE
WF71-6100	SINGLE CIRCULATOR (NO LOAD) HI POWER	450-470	250	FIXED	30	500.00
WF71-6103	SINGLE ISOLATOR WITH 60 WATT LOAD	"	"	"	"	630.00
WF71-6104	" " " 100 " "	"	"	"	"	685.00
WF71-6106	" " " 200 " "	"	"	"	"	775.00
WF71-6200	DUAL CIRCULATOR (NO LOADS)	"	"	"	70	1100.00
WF71-6213	DUAL ISOLATOR WITH 15 AND 60 WATT LOADS	"	"	"	"	1280.00
WF71-6214	" " " 15 " 100 " "	"	"	"	"	1335.00
WF71-6215	" " " 15 " 150 " "	"	"	"	"	1380.00
WF8★-4100	SINGLE CIRCULATOR (NO LOAD)	850-960	150	FIXED	30	325.00
WF8★-4101	SINGLE ISOLATOR WITH 15 WATT LOAD	"	"	"	"	375.00
WF8★-4102	" " " 25 " "	"	"	"	"	410.00
WF8★-4103	" " " 60 " "	"	"	"	"	455.00
WF8★-4200	DUAL CIRCULATOR (NO LOADS)	"	"	"	70	550.00
WF8★-4211	DUAL ISOLATOR WITH 15 AND 15 WATT LOADS	"	"	"	"	650.00
WF8★-4212	" " " 15 " 25 " "	"	"	"	"	685.00
WF8★-4213	" " " 15 " 60 " "	"	"	"	"	730.00
WF8★-6100	SINGLE CIRCULATOR (NO LOAD) HI POWER	850-960	250	FIXED	30	400.00
WF8★-6103	SINGLE ISOLATOR WITH 60 WATT LOAD	"	"	"	"	530.00
WF8★-6104	" " " 100 " "	"	"	"	"	585.00
WF8★-6105	" " " 150 " "	"	"	"	"	630.00
WF8★-6200	DUAL CIRCULATOR (NO LOADS)	"	"	"	70	700.00
WF8★-6213	DUAL ISOLATOR WITH 15 AND 60 WATT LOADS	"	"	"	"	880.00
WF8★-6214	" " " 15 " 100 " "	"	"	"	"	935.00
WF8★-6215	" " " 15 " 150 " "	"	"	"	"	980.00
WF8★-8100	SINGLE CIRCULATOR (NO LOAD) HI POWER	850-960	350	FIXED	30	480.00
WF8★-8104	SINGLE ISOLATOR WITH 100 WATT LOAD	"	"	"	"	665.00
WF8★-8105	" " " 150 " "	"	"	"	"	710.00
WF8★-8106	" " " 200 " "	"	"	"	"	755.00
WF8★-8200	DUAL CIRCULATOR (NO LOADS)	"	"	"	70	900.00
WF8★-8224	DUAL ISOLATOR WITH 25 AND 100 WATT LOADS	"	"	"	"	1170.00
WF8★-8225	" " " 25 " 150 " "	"	"	"	"	1215.00
WF8★-8226	" " " 25 " 200 " "	"	"	"	"	1260.00

NOTE 1: This column does not necessarily indicate operational bandwidth of isolators.

NOTE 2: The 15 and 25 watt loads are screw-on type. All other loads are panel mounted type and are supplied with mounting brackets and matched jumper cable.

LOAD TERMINATIONS

MODEL	POWER RATING AND DESCRIPTION	CONNECTOR TYPE	PRICE
WLT-001B	¼ WATT LOAD, SCREW-ON, FOR USE WITH RX COUPLER	BNC MALE	10.00
WLT-001N	" " " " " " " " "	N MALE	12.00
WLT-3015	15 WATT LOAD, SCREW-ON, FOR USE WITH ISOLATORS	"	50.00
WLT-3025	25 " " " " " " "	"	85.00
WLT-5060	60 WATT LOAD, PANEL MOUNT, WITH MTG. BRACKETS & JUMPER CABLE	N FEMALE	130.00
WLT-5100	100 " " " " " " " " " "	"	185.00
WLT-5150	150 " " " " " " " " " "	"	230.00
WLT-5200	200 " " " " " " " " " "	"	275.00
WLT-5250	250 " " " " " " " " " "	"	350.00

HYBRID COUPLER PANELS

MODEL	DESCRIPTION	FREQUENCY BAND	MAX POWER EA. CHANNEL (WATTS)	PANEL HEIGHT	PRICE
WP-9430	TUNABLE HYBRID COUPLER WITH 150 WATT LOAD	148-174	125	3½"	650.00
WP-9431	" " " " 250 " "	"	250	5¼"	770.00
WP-9470	TUNABLE HYBRID COUPLER WITH 150 WATT LOAD	406-512	125	3½"	610.00
WP-9471	" " " " 250 " "	"	250	5¼"	730.00
WP-9480	TUNABLE HYBRID COUPLER WITH 150 WATT LOAD	850-960	125	3½"	610.00
WP-9481	" " " " 250 " "	"	250	5¼"	730.00

NOTE: Models may be available to cover other frequency bands. Contact factory for details.

MISCELLANEOUS TX COMBINER COMPONENTS

MODEL	DESCRIPTION	CONNECTOR TYPE	PRICE
WLP-130U	LOW PASS FILTER TO PASS 144-174 MHz, WITH UHF MALE, FEMALE	UHF	150.00
WLP-130N	" " " " " " " " WITH TYPE N MALE, FEMALE	TYPE N	150.00
WLP-170U	" " " " " 440-512 MHz, WITH UHF MALE, FEMALE	UHF	135.00
WLP-170N	" " " " " " " " WITH TYPE N MALE, FEMALE	TYPE N	135.00
WLP-180U	" " " " " 806-960 MHz, WITH UHF MALE, FEMALE	UHF	135.00
WLP-180N	" " " " " " " " WITH TYPE N MALE, FEMALE	TYPE N	135.00
WNF-130N	SECOND HARMONIC FILTER, PASS 144-174 MHz	TYPE N	80.00
WNF-170N	" " " PASS 440-512 MHz	"	80.00
WNF-180N	" " " PASS 806-960 MHz	"	80.00
WZM-130N	IMPEDANCE MATCHER FOR 144-174 MHz BAND	TYPE N	120.00
WZM-170N	" " " 440-512 MHz "	"	110.00
WZM-180N	" " " 806-960 MHz "	"	110.00
WCC-1037	CROSSBAND COUPLER FOR 144-174 AND 406-512 MHz BANDS	TYPE N	350.00
WCC-1078	" " " 440-512 AND 806-960 " "	"	300.00
OC-121406	WEATHERPROOF (NEMA 4) CASE FOR EITHER OF ABOVE CROSSBAND COUPLERS	"	100.00

INTERMOD SUPPRESSION PANELS

MODEL	DESCRIPTION	FREQUENCY BAND	MAX POWER (WATTS)	PANEL HEIGHT	PRICE
WP-9530	IM PANEL, WITH LP FILTER, S G L ISOLATOR & 25 W LOAD	148-174	125	5¼"	650.00
WP-9531	" " " " " " " " 100 " "	"	"	"	750.00
WP-9536	IM PANEL, WITH LP FILTER, DUAL ISOLATOR & 25 W LOAD	"	"	"	925.00
WP-9537	" " " " " " " " 100 " "	"	"	"	1025.00
WP-9570	IM PANEL, WITH LP FILTER, S G L ISOLATOR & 25 W LOAD	406-512	125	5¼"	620.00
WP-9571	" " " " " " " " 100 " "	"	"	"	720.00
WP-9576	IM PANEL, WITH LP FILTER, DUAL ISOLATOR & 25 W LOAD	"	"	"	895.00
WP-9577	" " " " " " " " 100 " "	"	"	"	995.00
WP-9580	IM PANEL, WITH LP FILTER, S G L ISOLATOR & 25 W LOAD	806-960	125	5¼"	620.00
WP-9581	" " " " " " " " 100 " "	"	"	"	720.00
WP-9586	IM PANEL, WITH LP FILTER, DUAL ISOLATOR & 25 W LOAD	"	"	"	895.00
WP-9587	" " " " " " " " 100 " "	"	"	"	995.00

NOTE: Models are available to cover other frequency bands. Contact factory for details.

INTERMOD SUPPRESSION PANELS (WITH CAVITY)

MODEL	DESCRIPTION	FREQUENCY BAND	MAX POWER (WATTS)	PANEL HEIGHT	PRICE
WP-9532	IM PANEL, WITH 8" OD CAVITY, S G L ISOLATOR & 25 W LOAD	148-174	125		700.00
WP-9533	" " " " " " " " 100 " "	"	"		800.00
WP-9538	IM PANEL, WITH 8" OD CAVITY, DUAL ISOLATOR & 25 W LOAD	"	"		975.00
WP-9539	" " " " " " " " 100 " "	"	"		1075.00
WP-9572	IM PANEL, WITH 4" OD CAVITY, S G L ISOLATOR & 25 W LOAD	406-512	125	5¼"	640.00
WP-9573	" " " " " " " " 100 " "	"	"	"	740.00
WP-9578	IM PANEL, WITH 4" OD CAVITY, DUAL ISOLATOR & 25 W LOAD	"	"	"	920.00
WP-9579	" " " " " " " " 100 " "	"	"	"	1020.00
WP-9582	IM PANEL, WITH 4" OD CAVITY, S G L ISOLATOR & 25 W LOAD	806-960	125	5¼"	640.00
WP-9583	" " " " " " " " 100 " "	"	"	"	740.00
WP-9588	IM PANEL, WITH 4" OD CAVITY, DUAL ISOLATOR & 25 W LOAD	"	"	"	920.00
WP-9589	" " " " " " " " 100 " "	"	"	"	1020.00

NOTE: Models are available to cover other frequency bands. Contact factory for details.

150 MHz-TRANSMITTER COMBINERS - 935 SERIES

MODEL	DESCRIPTION	CONNECTOR TYPE	PRICE
WP-935-2	2-CHANNEL, 125 WATT TRANSMITTER COMBINER (EXPANDABLE) FOR THE 150-174 MHz BAND, INCLUDING 19" x 82" OPEN RACK	N FEMALE	2850.00
WP-935-3	3-CHANNEL, AS DESCRIBED ABOVE	"	4000.00
WP-935-4	4-CHANNEL, AS DESCRIBED ABOVE	"	5150.00
WP-935-5	5-CHANNEL, AS DESCRIBED ABOVE	"	6300.00
WP-935-6	6-CHANNEL, AS DESCRIBED ABOVE	"	7450.00
WP-935-7	7-CHANNEL, AS DESCRIBED ABOVE	"	8600.00
WP-935-8	8-CHANNEL, AS DESCRIBED ABOVE	"	9750.00
XP-935	EXPANSION PANEL TO ADD ONE MORE CHANNEL TO WP-935 COMBINER	"	1150.00

450 MHz-TRANSMITTER COMBINERS - 976 SERIES

MODEL	DESCRIPTION	CONNECTOR TYPE	PRICE
WP-976-2	2-CHANNEL, 125 WATT TRANSMITTER COMBINER (EXPANDABLE) FOR THE 450-512 MHz BAND, INCLUDING 24" x 82" OPEN RACK	N FEMALE	2850.00
WP-976-3	3-CHANNEL, AS DESCRIBED ABOVE	"	4000.00
WP-976-4	4-CHANNEL, AS DESCRIBED ABOVE	"	5150.00
WP-976-5	5-CHANNEL, AS DESCRIBED ABOVE	"	6300.00
WP-976-6	6-CHANNEL, AS DESCRIBED ABOVE	"	7450.00
WP-976-7	7-CHANNEL, AS DESCRIBED ABOVE	"	8600.00
WP-976-8	8-CHANNEL, AS DESCRIBED ABOVE	"	9750.00
XP-936	EXPANSION PANEL TO ADD ONE MORE CHANNEL TO WP-976 COMBINER	"	1150.00
C82-976	OPTION DELETES 82" RACK AND ADDS 24" x 82" CABINET ADD		380.00

450 MHz COMBINER EXPANSION PANELS

MODEL	DESCRIPTION	CONNECTOR TYPE	PRICE
XP-970	EXPANSION PANEL TO ADD ONE MORE CHANNEL TO WP-970 COMBINER	N FEMALE	1350.00
XP-975	EXPANSION PANEL TO ADD ONE MORE CHANNEL TO WP-975 COMBINER	"	1150.00
XP-976	EXPANSION PANEL TO ADD ONE MORE CHANNEL TO WP-976 COMBINER	"	1150.00

850 MHz-TRANSMITTER COMBINERS - 994 SERIES

MODEL	DESCRIPTION	CONNECTOR TYPE	PRICE
WP-994-2	2-CHANNEL, 150 WATT TRANSMITTER COMBINER (EXPANDABLE) FOR THE 850-960 MHz BAND, INCLUDING 19" x 82" RELAY RACK	N FEMALE	2850.00
WP-994-3	3-CHANNEL, AS DESCRIBED ABOVE	"	4000.00
WP-994-4	4-CHANNEL, AS DESCRIBED ABOVE	"	5150.00
WP-994-5	5-CHANNEL, AS DESCRIBED ABOVE	"	6300.00
WP-994-6	6-CHANNEL, AS DESCRIBED ABOVE	"	7450.00
WP-994-7	7-CHANNEL, AS DESCRIBED ABOVE	"	8600.00
WP-994-8	8-CHANNEL, AS DESCRIBED ABOVE	"	9750.00
WP-994-9	9-CHANNEL, AS DESCRIBED ABOVE	"	10,900.00
WP-994-10	10-CHANNEL, AS DESCRIBED ABOVE	"	12,050.00
XP-994	EXPANSION PANEL TO ADD ONE MORE CHANNEL TO WP-994 COMBINER	"	1150.00
C82-994	OPTION DELETES 82" RACK AND ADDS 19" x 82" CABINET ADD		330.00

850 MHz COMBINER EXPANSION PANELS

MODEL	DESCRIPTION	CONNECTOR TYPE	PRICE
XP-990	EXPANSION PANEL TO ADD ONE MORE CHANNEL TO WP-990 COMBINER	N FEMALE	1350.00
XP-994	EXPANSION PANEL TO ADD ONE MORE CHANNEL TO WP-994 COMBINER	"	1150.00
XP-995	EXPANSION PANEL TO ADD ONE MORE CHANNEL TO WP-995 COMBINER	"	1150.00

HYBRID COUPLER TX COMBINERS

MODEL	DESCRIPTION	FREQUENCY BAND	POWER INPUT EACH CHANNEL	INSERTION LOSS - dB	PRICE
WP-937-2	TWO CHANNEL TX COMBINER, DUAL ISOLATOR PER CHANNEL	144-174	125	4.2	2640.00
WP-937-3	THREE " " " " " " "	"	"	7.7	4375.00
WP-937-4	FOUR " " " " " " "	"	"	7.7	6010.00
WP-977-2	TWO CHANNEL TX COMBINER, DUAL ISOLATOR PER CHANNEL	450-512	125	4.1	2565.00
WP-977-3	THREE " " " " " " "	"	"	7.6	4220.00
WP-977-4	FOUR " " " " " " "	"	"	7.6	5890.00
WP-997-2	TWO CHANNEL TX COMBINER, DUAL ISOLATOR PER CHANNEL	806-960	125	4.1	2565.00
WP-997-3	THREE " " " " " " "	"	"	7.6	4220.00
WP-997-4	FOUR " " " " " " "	"	"	7.6	5890.00
WP-999-2	HIGH POWER TWO CHANNEL TX COMBINER, DUAL ISOLATOR	806-960	250	4.1	3380.00
WP-999-3	" " THREE " " " " "	"	"	7.6	5580.00
WP-999-4	" " FOUR " " " " "	"	"	7.6	7700.00

SPECIAL PRODUCTS FOR 900 MHz PAGING

MODEL	DESCRIPTION	FREQUENCY BAND MHz	FREQUENCY SEPARATION MHz	MAX. POWER EACH CHANNEL	PRICE
WP-9910	2-CHANNEL TX COMBINER TO COUPLE TWO 300 WATT TRANSMITTERS INTO ONE ANTENNA. INCLUDES SINGLE ISOLATOR (100 WATT LOAD) AND TWO 7" OD BP CAVITIES IN EACH CHANNEL, ALL MOUNTED ON A 15¾ X 19" PANEL. UP TO 900 KHZ PASSBAND.	900-960	2.0 TO 30	300	3345.00
WP-9920	2-CHANNEL TX COMBINER TO COUPLE TWO 250 WATT TRANSMITTERS INTO ONE ANTENNA. INCLUDES A SINGLE ISOLATOR (150 WATT LOAD) AND 8" OD NOTCH FILTER IN EACH SECTION, ALL MOUNTED ON A 10½ X 19" PANEL. FOR USE IN SYSTEMS WHEN FREQUENCY SEPARATION IS 0.5 TO 1.0 MHz.	900-960	0.5 TO 1.0	250	2568.00
WP-9920-A	2-CHANNEL TX COMBINER. SAME AS ABOVE EXCEPT FOR USE WITH TWO 300 WATT TRANSMITTERS.	900-960	0.5 TO 1.0	300	2728.00
WP-9921	2-CHANNEL TX COMBINER TO COUPLE TWO 250 WATT TRANSMITTERS INTO ONE ANTENNA. INCLUDES A SINGLE ISOLATOR (150 WATT LOAD) AND 8" OD BANDPASS CAVITIES IN EACH SECTION, ALL MOUNTED ON A 10½ X 19" PANEL. FOR USE IN SYSTEMS WHEN FREQUENCY SEPARATION IS 1.0 TO 2.0 MHz.	900-960	1.0 TO 2.0	250	2568.00
WP-9921-A	2-CHANNEL TX COMBINER. SAME AS ABOVE EXCEPT FOR USE WITH 300 WATT TRANSMITTERS.	900-960	1.0 TO 2.0	300	2728.00
WP-9922	2-CHANNEL TX COMBINER TO COUPLE TWO 250 WATT TRANSMITTERS INTO ONE ANTENNA. INCLUDES A SINGLE ISOLATOR (150 WATT LOAD) AND 8" OD BANDPASS CAVITY IN EACH SECTION, ALL MOUNTED ON A 10½ X 19" PANEL. FOR USE IN SYSTEMS WHEN FREQUENCY SEPARATION IS 2.0 TO 30 MHz.	900-960	2.0 TO 30	250	2568.00
WP-9922-A	2-CHANNEL TX COMBINER. SAME AS ABOVE EXCEPT FOR USE WITH 300 WATT TRANSMITTERS.	900-960	2.0 TO 30	300	2728.00
WP-691-SP10	SPECIAL DUPLEXER FOR USE AS A 2-TRANSMITTER COMBINER AT 2.0 MHz OR MORE SEPARATION IN THE 900-960 MHz BAND. INCLUDES FOUR 8" OD CAVITIES (TWO BpBr IN EACH SECTION) INTERCONNECTED WITH RG-393 CABLE AND SPECIAL OUTPUT CONNECTOR, ALL MOUNTED ON A 17½" x 19" PANEL FOR RACK MOUNTING.	900-960	2 TO 10	300	1200.00

TERMS AND CONDITIONS OF SALE

WARRANTY — The Seller warrants that, at the time of shipment, the products manufactured by the Seller are free from defects in material and workmanship. The Seller's obligation under this warranty is limited to replacement or repair of such products within one year from the date of shipment. No material is accepted for replacement or repair without the written authority of the Seller. Replacement or repair is made only after an examination at the Waco, Texas, plant shows defective material or workmanship at the time of manufacture. All shipping charges on returned material must be prepaid by the Buyer. Seller is in no event liable for consequential damages, installation cost or other costs of any nature as a result of the use of the products manufactured by the Seller, whether used in accordance with instructions or not.

QUOTATIONS — Only written quotations are valid.

CREDIT APPROVAL — Orders are subject to the approval of Seller's Credit Department and will be shipped C.O.D. unless open account credit has been established.

PRICES — Prices listed are F.O.B. Seller's plant in Waco, Texas, and are subject to change without notice. Terms are net 30 days from date of invoice. Prices do not include Federal, State or Local sales or excise taxes. Prices include packing suitable for domestic shipment. Export packing is extra.

SPECIFICATION CHANGES — All designs and specifications of Seller's products are subject to change without notice provided the changes do not materially affect performance.

SHIPMENTS — Shipments are made with transportation charges collect unless otherwise specified by the Buyer. Buyer's routing is used where practicable. Shipments are routed according to Seller's best judgment unless carrier is specified by Buyer. The Seller is not held responsible for selecting cheapest or fastest routing.

RETURNED MATERIAL — Written authorization must be obtained before returning material. Credit not exceeding 80% of the original price is allowed on unused material provided it is returned prepaid and in new condition. In no case will Seller authorize return of material more than ninety days after shipment from Seller's plant. Credit for returned material is issued by the Seller only to the original purchaser.

CLAIMS FOR SHORTAGES — Claims for shortages must be made within thirty days after date of shipment of material from Seller's plant.

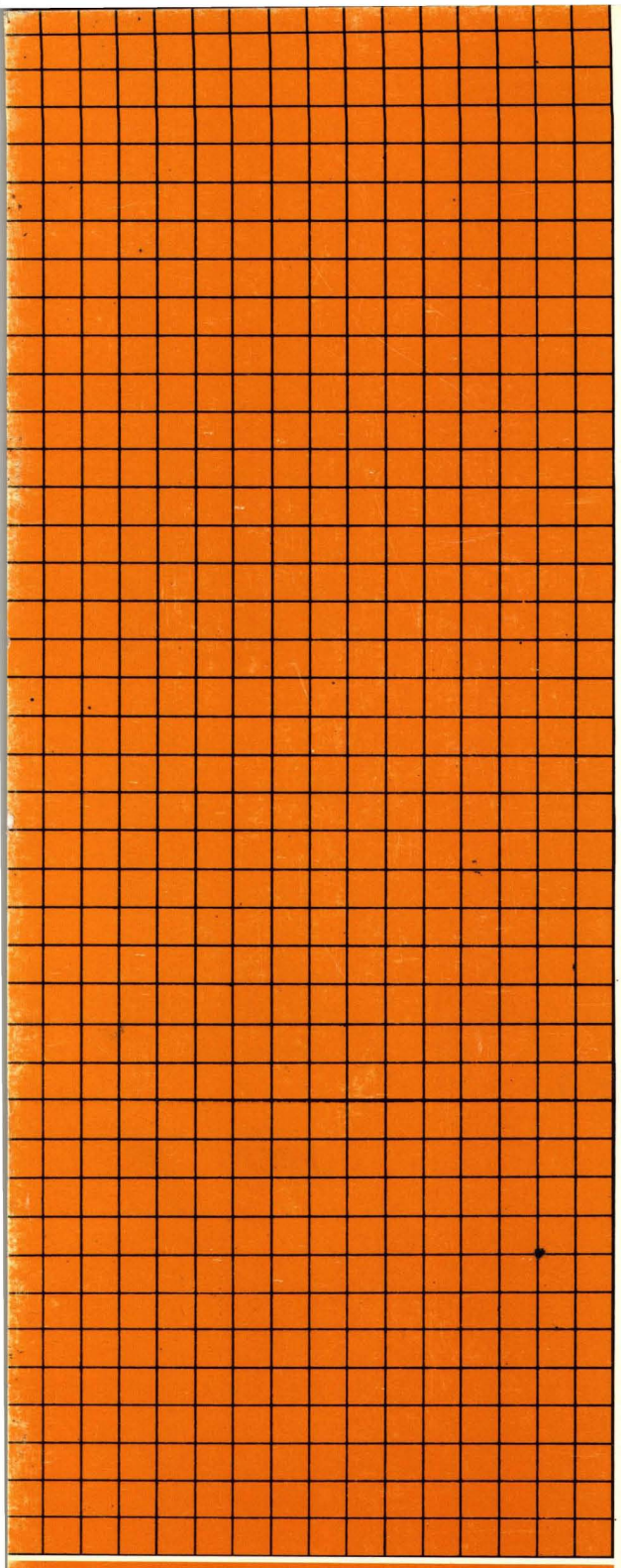
CLAIMS FOR DAMAGE OR LOSS IN TRANSIT — Claims for damage or loss while material is in transit must be made immediately against the carrier by the Buyer.

DELAYS OR INABILITY TO PERFORM — The Seller is not liable for delays or inability to fulfill contractural obligations when the causes thereof are beyond the reasonable control of the Seller.

CANCELLATION OR CHANGES IN ORDERS — Cancellation of, or changes to, acknowledged orders by the Buyer are accepted only upon terms that protect Seller against loss.

WACOM PRODUCTS, INC.

P.O. BOX 21145 • WACO, TEXAS 76702 • (817) 848-4435 • FAX (817) 848-4209



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